EDA Human Activity Analysis using Smartphone Dataset

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The dataset has information on various sensors on mobile phone, the data set has been split into training(70%) and testing(30%), with activities manually labelled with the associated activity and subject under consideration in the training data set.

We use this data to predict the activity of the user based on readings from the mobile sensors

Loading the data

Downloading

```
fileUrl =
  "https://spark-public.s3.amazonaws.com/dataanalysis/samsungData.rda"
if (!file.exists('./samsungData.rda')){
  download.file(fileUrl,'./samsungData.rda')
}
```

Loading

```
load("samsungData.rda")
```

Exploring the data

```
head(samsungData)
```

```
##   tBodyAcc-mean()-X tBodyAcc-mean()-Y tBodyAcc-mean()-Z tBodyAcc-std()-X
## 1         0.2885845       -0.02029417        -0.1329051       -0.9952786
## 2         0.2784188       -0.01641057        -0.1235202       -0.9982453
## 3         0.2796531       -0.01946716        -0.1134617       -0.9953796
## 4         0.2791739       -0.02620065        -0.1232826       -0.9960915
## 5         0.2766288       -0.01656965        -0.1153619       -0.9981386
## 6         0.2771988       -0.01009785        -0.1051373       -0.9973350
##   tBodyAcc-std()-Y tBodyAcc-std()-Z tBodyAcc-mad()-X tBodyAcc-mad()-Y
## 1       -0.9831106       -0.9135264       -0.9951121       -0.9831846
## 2       -0.9753002       -0.9603220       -0.9988072       -0.9749144
```

```
## 3       -0.9671870       -0.9789440       -0.9965199       -0.9636684
## 4       -0.9834027       -0.9906751       -0.9970995       -0.9827498
## 5       -0.9808173       -0.9904816       -0.9983211       -0.9796719
## 6       -0.9904868       -0.9954200       -0.9976274       -0.9902177
##   tBodyAcc-mad()-Z tBodyAcc-max()-X tBodyAcc-max()-Y tBodyAcc-max()-Z
## 1       -0.9235270       -0.9347238       -0.5673781       -0.7444125
## 2       -0.9576862       -0.9430675       -0.5578513       -0.8184087
## 3       -0.9774686       -0.9386916       -0.5578513       -0.8184087
## 4       -0.9893025       -0.9386916       -0.5761589       -0.8297115
## 5       -0.9904411       -0.9424691       -0.5691738       -0.8247053
## 6       -0.9955489       -0.9424691       -0.5656839       -0.8227661
##   tBodyAcc-min()-X tBodyAcc-min()-Y tBodyAcc-min()-Z tBodyAcc-sma()
## 1        0.8529474        0.6858446        0.8142628     -0.9655228
## 2        0.8493079        0.6858446        0.8226368     -0.9819301
## 3        0.8436090        0.6824009        0.8393442     -0.9834778
## 4        0.8436090        0.6824009        0.8378693     -0.9860933
## 5        0.8490951        0.6832498        0.8378693     -0.9926531
## 6        0.8490951        0.6955857        0.8459216     -0.9939277
##   tBodyAcc-energy()-X tBodyAcc-energy()-Y tBodyAcc-energy()-Z tBodyAcc-iqr()-X
## 1          -0.9999446          -0.9998630          -0.9946122       -0.9942308
## 2          -0.9999913          -0.9997884          -0.9984054       -0.9991504
## 3          -0.9999691          -0.9996599          -0.9994695       -0.9971301
## 4          -0.9999755          -0.9997360          -0.9995037       -0.9971804
## 5          -0.9999906          -0.9998559          -0.9997566       -0.9980043
## 6          -0.9999855          -0.9998570          -0.9999174       -0.9975839
##   tBodyAcc-iqr()-Y tBodyAcc-iqr()-Z tBodyAcc-entropy()-X tBodyAcc-entropy()-Y
## 1       -0.9876139       -0.9432200           -0.4077471           -0.6793375
## 2       -0.9778655       -0.9482248           -0.7148917           -0.5009300
## 3       -0.9648099       -0.9746750           -0.5922351           -0.4858207
## 4       -0.9837991       -0.9860068           -0.6274463           -0.8509300
## 5       -0.9812319       -0.9913247           -0.7865525           -0.5594769
## 6       -0.9918468       -0.9954136           -0.7518691           -0.4547725
##   tBodyAcc-entropy()-Z tBodyAcc-arCoeff()-X,1 tBodyAcc-arCoeff()-X,2
## 1           -0.6021219             0.92929351            -0.85301114
## 2           -0.5709791             0.61162716            -0.32954862
## 3           -0.5709791             0.27302484            -0.08630870
## 4           -0.9118716             0.06143571             0.07483956
## 5           -0.7614338             0.31327553            -0.13120773
## 6           -0.5508815             0.39005211            -0.18227238
##   tBodyAcc-arCoeff()-X,3 tBodyAcc-arCoeff()-X,4 tBodyAcc-arCoeff()-Y,1
## 1              0.3599098            -0.05852638             0.25689154
## 2              0.2842132             0.28459454             0.11570542
## 3              0.3372015            -0.16473870             0.01715013
## 4              0.1982040            -0.26430733             0.07254524
## 5              0.1911608             0.08690362             0.25761535
## 6              0.1587515             0.18731256             0.25995104
##   tBodyAcc-arCoeff()-Y,2 tBodyAcc-arCoeff()-Y,3 tBodyAcc-arCoeff()-Y,4
## 1            -0.22484763              0.2641057            -0.09524563
## 2            -0.09096253              0.2943104            -0.28121057
## 3            -0.07450693              0.3422563            -0.33256448
## 4            -0.15531983              0.3231540            -0.17081296
## 5            -0.27250466              0.4347278            -0.31537507
## 6            -0.24322958              0.4217361            -0.41846005
##   tBodyAcc-arCoeff()-Z,1 tBodyAcc-arCoeff()-Z,2 tBodyAcc-arCoeff()-Z,3
```

```
## 1             0.27885143           -0.46508457             0.49193596
## 2             0.08598843           -0.02215269            -0.01665654
## 3             0.23928053           -0.13620359             0.17386318
## 4             0.29493839           -0.30608099             0.48214783
## 5             0.43974437           -0.26906895             0.17941419
## 6             0.55846137           -0.21834364             0.16513807
##   tBodyAcc-arCoeff()-Z,4 tBodyAcc-correlation()-X,Y tBodyAcc-correlation()-X,Z
## 1            -0.19088356                0.37631389                0.43512919
## 2            -0.22064350               -0.01342866               -0.07269189
## 3            -0.29949278               -0.12469839               -0.18110479
## 4            -0.47012871               -0.30569299               -0.36265405
## 5            -0.08895195               -0.15580432               -0.18976271
## 6             0.08092016               -0.20997915               -0.15106365
##   tBodyAcc-correlation()-Y,Z tGravityAcc-mean()-X tGravityAcc-mean()-Y
## 1                  0.6607903           0.9633961          -0.1408397
## 2                  0.5793817           0.9665611          -0.1415513
## 3                  0.6089001           0.9668781          -0.1420098
## 4                  0.5074589           0.9676152          -0.1439765
## 5                  0.5992130           0.9682244          -0.1487502
## 6                  0.1804244           0.9679482          -0.1482100
##   tGravityAcc-mean()-Z tGravityAcc-std()-X tGravityAcc-std()-Y
## 1           0.11537494          -0.9852497          -0.9817084
## 2           0.10937881          -0.9974113          -0.9894474
## 3           0.10188392          -0.9995740          -0.9928658
## 4           0.09985014          -0.9966456          -0.9813928
## 5           0.09448590          -0.9984293          -0.9880982
## 6           0.09190972          -0.9989793          -0.9867539
##   tGravityAcc-std()-Z tGravityAcc-mad()-X tGravityAcc-mad()-Y
## 1          -0.8776250          -0.9850014          -0.9844162
## 2          -0.9316387          -0.9978836          -0.9896137
## 3          -0.9929172          -0.9996353          -0.9926049
## 4          -0.9784764          -0.9964569          -0.9809618
## 5          -0.9787449          -0.9984112          -0.9886539
## 6          -0.9973064          -0.9990540          -0.9865839
##   tGravityAcc-mad()-Z tGravityAcc-max()-X tGravityAcc-max()-Y
## 1          -0.8946774           0.8920545          -0.1612655
## 2          -0.9332404           0.8920603          -0.1613426
## 3          -0.9929343           0.8924006          -0.1637112
## 4          -0.9784558           0.8938171          -0.1637112
## 5          -0.9789355           0.8938171          -0.1667862
## 6          -0.9974188           0.8936834          -0.1669704
##   tGravityAcc-max()-Z tGravityAcc-min()-X tGravityAcc-min()-Y
## 1          0.12465977           0.9774363          -0.1232134
## 2          0.12258573           0.9845201          -0.1148933
## 3          0.09456584           0.9867701          -0.1148933
## 4          0.09342467           0.9868210          -0.1213358
## 5          0.09168239           0.9874335          -0.1218336
## 6          0.08334712           0.9877218          -0.1218336
##   tGravityAcc-min()-Z tGravityAcc-sma() tGravityAcc-energy()-X
## 1          0.05648273        -0.3754260              0.8994686
## 2          0.10276411        -0.3834296              0.9078289
## 3          0.10276411        -0.4016016              0.9086678
## 4          0.09575265        -0.4002781              0.9106207
## 5          0.09405935        -0.4004765              0.9122347
```

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## 6          0.09405935        -0.4093585              0.9115026
##   tGravityAcc-energy()-Y tGravityAcc-energy()-Z tGravityAcc-iqr()-X
## 1             -0.9709052             -0.9755104          -0.9843254
## 2             -0.9705828             -0.9785004          -0.9991884
## 3             -0.9703681             -0.9816723          -0.9996790
## 4             -0.9693997             -0.9824196          -0.9959764
## 5             -0.9670511             -0.9843626          -0.9983182
## 6             -0.9673206             -0.9852754          -0.9993483
##   tGravityAcc-iqr()-Y tGravityAcc-iqr()-Z tGravityAcc-entropy()-X
## 1          -0.9888491          -0.9177426                      -1
## 2          -0.9900285          -0.9416854                      -1
## 3          -0.9921044          -0.9926186                      -1
## 4          -0.9806634          -0.9797787                      -1
## 5          -0.9906113          -0.9804125                      -1
## 6          -0.9865648          -0.9977279                      -1
##   tGravityAcc-entropy()-Y tGravityAcc-entropy()-Z tGravityAcc-arCoeff()-X,1
## 1                      -1              0.1138061              -0.590425000
## 2                      -1             -0.2104936              -0.410055520
## 3                      -1             -0.9267763               0.002234132
## 4                      -1             -0.5961008              -0.064934877
## 5                      -1             -0.6165782              -0.257266810
## 6                      -1             -1.0000000              -0.302224840
##   tGravityAcc-arCoeff()-X,2 tGravityAcc-arCoeff()-X,3 tGravityAcc-arCoeff()-X,4
## 1                0.59114630               -0.59177346                0.59246928
## 2                0.41385634               -0.41756716                0.42132499
## 3                0.02748069               -0.05672816                0.08553324
## 4                0.07542720               -0.08582296                0.09620771
## 5                0.26891819               -0.28066510                0.29261602
## 6                0.37903209               -0.45722246                0.53679840
##   tGravityAcc-arCoeff()-Y,1 tGravityAcc-arCoeff()-Y,2 tGravityAcc-arCoeff()-Y,3
## 1                -0.7454488                0.72086167                -0.7123724
## 2                -0.1963593                0.12534464                -0.1055677
## 3                -0.3290230                0.27050025                -0.2544902
## 4                -0.2950360                0.22830973                -0.2062812
## 5                -0.1666931                0.08994272                -0.0663267
## 6                -0.1981248                0.12718522                -0.1075539
##   tGravityAcc-arCoeff()-Y,4 tGravityAcc-arCoeff()-Z,1 tGravityAcc-arCoeff()-Z,2
## 1                 0.7113000                -0.9951116                 0.9956749
## 2                 0.1090901                -0.8338821                 0.8342711
## 3                 0.2575976                -0.7050392                 0.7143920
## 4                 0.2048009                -0.3854102                 0.3863727
## 5                 0.0671311                -0.2374745                 0.2392680
## 6                 0.1113645                -0.1579059                 0.1753748
##   tGravityAcc-arCoeff()-Z,3 tGravityAcc-arCoeff()-Z,4
## 1                -0.9956676                 0.9916527
## 2                -0.8341844                 0.8304639
## 3                -0.7232989                 0.7287554
## 4                -0.3871199                 0.3852631
## 5                -0.2410121                 0.2405685
## 6                -0.1927680                 0.2079647
##   tGravityAcc-correlation()-X,Y tGravityAcc-correlation()-X,Z
## 1                     0.5702216                     0.4390273
## 2                    -0.8312839                    -0.8657111
## 3                    -0.1810899                     0.3379359
```

```
## 4                   -0.9913087                   -0.9688214
## 5                   -0.4083304                   -0.1848401
## 6                   -0.5639509                    0.4664707
##   tGravityAcc-correlation()-Y,Z tBodyAccJerk-mean()-X tBodyAccJerk-mean()-Y
## 1                     0.9869131           0.07799634           0.005000803
## 2                     0.9743856           0.07400671           0.005771104
## 3                     0.6434170           0.07363596           0.003104037
## 4                     0.9842555           0.07732061           0.020057642
## 5                     0.9647965           0.07344436           0.019121574
## 6                     0.4430971           0.07793244           0.018684046
##   tBodyAccJerk-mean()-Z tBodyAccJerk-std()-X tBodyAccJerk-std()-Y
## 1          -0.067830808          -0.9935191          -0.9883600
## 2           0.029376633          -0.9955481          -0.9810636
## 3          -0.009045631          -0.9907428          -0.9809556
## 4          -0.009864772          -0.9926974          -0.9875527
## 5           0.016779979          -0.9964202          -0.9883587
## 6           0.009344434          -0.9948136          -0.9887145
##   tBodyAccJerk-std()-Z tBodyAccJerk-mad()-X tBodyAccJerk-mad()-Y
## 1           -0.9935750          -0.9944876          -0.9862066
## 2           -0.9918457          -0.9956320          -0.9789380
## 3           -0.9896866          -0.9909329          -0.9793002
## 4           -0.9934976          -0.9942660          -0.9857170
## 5           -0.9924549          -0.9965974          -0.9865370
## 6           -0.9922663          -0.9952418          -0.9868467
##   tBodyAccJerk-mad()-Z tBodyAccJerk-max()-X tBodyAccJerk-max()-Y
## 1           -0.9928183          -0.9851801          -0.9919942
## 2           -0.9912766          -0.9945447          -0.9790682
## 3           -0.9872381          -0.9870770          -0.9790682
## 4           -0.9914832          -0.9870770          -0.9917862
## 5           -0.9906864          -0.9969933          -0.9918178
## 6           -0.9910667          -0.9941054          -0.9918178
##   tBodyAccJerk-max()-Z tBodyAccJerk-min()-X tBodyAccJerk-min()-Y
## 1           -0.9931189           0.9898347           0.9919569
## 2           -0.9922574           0.9925771           0.9918084
## 3           -0.9922574           0.9883902           0.9918084
## 4           -0.9897689           0.9883902           0.9925438
## 5           -0.9897689           0.9943032           0.9925438
## 6           -0.9926493           0.9943032           0.9933463
##   tBodyAccJerk-min()-Z tBodyAccJerk-sma() tBodyAccJerk-energy()-X
## 1            0.9905192         -0.9935220              -0.9999349
## 2            0.9885391         -0.9913937              -0.9999597
## 3            0.9885391         -0.9881477              -0.9998942
## 4            0.9932176         -0.9928683              -0.9999236
## 5            0.9856091         -0.9938320              -0.9999692
## 6            0.9856091         -0.9934730              -0.9999512
##   tBodyAccJerk-energy()-Y tBodyAccJerk-energy()-Z tBodyAccJerk-iqr()-X
## 1              -0.9998204              -0.9998785           -0.9943640
## 2              -0.9996396              -0.9998454           -0.9938627
## 3              -0.9996364              -0.9997950           -0.9878457
## 4              -0.9998029              -0.9998829           -0.9946780
## 5              -0.9998203              -0.9998599           -0.9958878
## 6              -0.9998278              -0.9998560           -0.9952809
##   tBodyAccJerk-iqr()-Y tBodyAccJerk-iqr()-Z tBodyAccJerk-entropy()-X
## 1           -0.9860249           -0.9892336               -0.8199492
```

```
## 2           -0.9794351           -0.9933838               -0.8750964
## 3           -0.9801445           -0.9819108               -0.7536287
## 4           -0.9870330           -0.9888963               -0.8208042
## 5           -0.9865242           -0.9905717               -0.8507439
## 6           -0.9873590           -0.9895520               -0.7787178
##   tBodyAccJerk-entropy()-Y tBodyAccJerk-entropy()-Z tBodyAccJerk-arCoeff()-X,1
## 1               -0.7930464               -0.8888529                   1.0000000
## 2               -0.6553621               -0.7673809                   0.4896622
## 3               -0.6732736               -0.7471068                   0.2652248
## 4               -0.7549682               -0.8252786                   0.1228930
## 5               -0.7462578               -0.7969596                   0.2409042
## 6               -0.7549682               -0.7908859                   0.2806858
##   tBodyAccJerk-arCoeff()-X,2 tBodyAccJerk-arCoeff()-X,3
## 1                -0.22074703                  0.6368308
## 2                 0.07099708                  0.3627145
## 3                 0.18839474                  0.4645835
## 4                 0.27641881                  0.4574450
## 5                 0.13491152                  0.2969029
## 6                 0.10044972                  0.2597405
##   tBodyAccJerk-arCoeff()-X,4 tBodyAccJerk-arCoeff()-Y,1
## 1                  0.3876436                 0.24140146
## 2                  0.5273034                 0.14939565
## 3                  0.3717179                 0.08266488
## 4                  0.1934143                 0.10240466
## 5                  0.2871847                 0.31897047
## 6                  0.2019468                 0.35057743
##   tBodyAccJerk-arCoeff()-Y,2 tBodyAccJerk-arCoeff()-Y,3
## 1               -0.052252848                  0.2641772
## 2                0.062925097                  0.3704934
## 3               -0.004621675                  0.3274702
## 4               -0.099103220                  0.1946788
## 5               -0.143364120                  0.4774545
## 6               -0.077269461                  0.5626646
##   tBodyAccJerk-arCoeff()-Y,4 tBodyAccJerk-arCoeff()-Z,1
## 1                  0.3734395                  0.3417775
## 2                  0.4135481                  0.1222157
## 3                  0.4376232                  0.2578909
## 4                  0.4842436                  0.3576571
## 5                  0.4179662                  0.3895371
## 6                  0.3519760                  0.3686890
##   tBodyAccJerk-arCoeff()-Z,2 tBodyAccJerk-arCoeff()-Z,3
## 1                -0.56979119                  0.2653988
## 2                 0.18061304                  0.0474240
## 3                 0.07002964                  0.1869730
## 4                -0.18703248                  0.2980687
## 5                -0.03030909                  0.1632612
## 6                 0.04338534                  0.1473115
##   tBodyAccJerk-arCoeff()-Z,4 tBodyAccJerk-correlation()-X,Y
## 1                 -0.4778749                     -0.3853005
## 2                  0.1665727                     -0.2087722
## 3                  0.2467997                     -0.1201047
## 4                  0.4518696                     -0.1274952
## 5                  0.1801889                     -0.2728836
## 6                  0.2991720                     -0.3746109
```

```
##   tBodyAccJerk-correlation()-X,Z tBodyAccJerk-correlation()-Y,Z
## 1                     0.03364394                    -0.12651082
## 2                     0.08410380                    -0.26855390
## 3                    -0.11002563                    -0.03995275
## 4                    -0.08327836                     0.45705983
## 5                     0.10306475                     0.06472931
## 6                     0.04182570                    -0.11178209
##   tBodyGyro-mean()-X tBodyGyro-mean()-Y tBodyGyro-mean()-Z tBodyGyro-std()-X
## 1       -0.006100849        -0.03136479         0.10772540        -0.9853103
## 2       -0.016111620        -0.08389378         0.10058429        -0.9831200
## 3       -0.031698294        -0.10233542         0.09612688        -0.9762921
## 4       -0.043409983        -0.09138618         0.08553770        -0.9913848
## 5       -0.033960416        -0.07470803         0.07739203        -0.9851836
## 6       -0.028775508        -0.07039311         0.07901214        -0.9851808
##   tBodyGyro-std()-Y tBodyGyro-std()-Z tBodyGyro-mad()-X tBodyGyro-mad()-Y
## 1        -0.9766234        -0.9922053        -0.9845863        -0.9763526
## 2        -0.9890458        -0.9891212        -0.9868904        -0.9890380
## 3        -0.9935518        -0.9863787        -0.9749215        -0.9941221
## 4        -0.9924073        -0.9875542        -0.9915889        -0.9931421
## 5        -0.9923781        -0.9874019        -0.9869437        -0.9925425
## 6        -0.9921175        -0.9830768        -0.9857856        -0.9922687
##   tBodyGyro-mad()-Z tBodyGyro-max()-X tBodyGyro-max()-Y tBodyGyro-max()-Z
## 1        -0.9923616        -0.8670437        -0.9337860        -0.7475662
## 2        -0.9891846        -0.8649038        -0.9535605        -0.7458700
## 3        -0.9857862        -0.8649038        -0.9590491        -0.7432771
## 4        -0.9895849        -0.8853204        -0.9566563        -0.7432771
## 5        -0.9881628        -0.8701541        -0.9533597        -0.7497799
## 6        -0.9827049        -0.8701541        -0.9533597        -0.7463994
##   tBodyGyro-min()-X tBodyGyro-min()-Y tBodyGyro-min()-Z tBodyGyro-sma()
## 1         0.8473080         0.9148953         0.8308405      -0.9671843
## 2         0.8337211         0.9081096         0.8289350      -0.9806131
## 3         0.8337211         0.9057528         0.8289350      -0.9762803
## 4         0.8341640         0.9057528         0.8266338      -0.9822957
## 5         0.8390906         0.9111845         0.8213744      -0.9852620
## 6         0.8398080         0.9111845         0.8188267      -0.9852143
##   tBodyGyro-energy()-X tBodyGyro-energy()-Y tBodyGyro-energy()-Z
## 1           -0.9995783           -0.9993543           -0.9997634
## 2           -0.9997558           -0.9998973           -0.9998224
## 3           -0.9996934           -0.9998283           -0.9998216
## 4           -0.9997929           -0.9999023           -0.9998773
## 5           -0.9998495           -0.9999519           -0.9998443
## 6           -0.9998740           -0.9999466           -0.9997780
##   tBodyGyro-iqr()-X tBodyGyro-iqr()-Y tBodyGyro-iqr()-Z tBodyGyro-entropy()-X
## 1        -0.9834381        -0.9786140        -0.9929656           0.082631682
## 2        -0.9928328        -0.9893447        -0.9902402           0.007469356
## 3        -0.9723536        -0.9951443        -0.9868311          -0.260942670
## 4        -0.9910313        -0.9941653        -0.9945820          -0.930551140
## 5        -0.9898132        -0.9933367        -0.9911546          -0.628860990
## 6        -0.9853373        -0.9929940        -0.9837056          -0.363801070
##   tBodyGyro-entropy()-Y tBodyGyro-entropy()-Z tBodyGyro-arCoeff()-X,1
## 1             0.2022676            -0.1687567              0.09632324
## 2            -0.5311566            -0.1774446             -0.38768063
## 3            -1.0000000            -0.2483707             -0.43715568
## 4            -0.8266180            -0.5434217             -0.16588549
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## 5            -0.4678076            -0.6508521             -0.21269027
## 6            -0.3705079            -0.4621260             -0.40282673
##   tBodyGyro-arCoeff()-X,2 tBodyGyro-arCoeff()-X,3 tBodyGyro-arCoeff()-X,4
## 1             -0.27498511              0.49864419             -0.22031685
## 2              0.17913763              0.21078900             -0.14025958
## 3              0.23898137              0.14523773             -0.11391720
## 4             -0.01288054              0.32005501             -0.16511393
## 5              0.00211118              0.38809860             -0.23327097
## 6              0.24203652              0.05913935              0.03028356
##   tBodyGyro-arCoeff()-Y,1 tBodyGyro-arCoeff()-Y,2 tBodyGyro-arCoeff()-Y,3
## 1              1.00000000             -0.97297139              0.31665451
## 2             -0.04703181             -0.06494907              0.11768661
## 3              0.03231156             -0.12787926              0.11492426
## 4              0.04455323             -0.12519331              0.07832123
## 5             -0.16322090              0.18645965             -0.43491617
## 6             -0.11969243              0.15061703             -0.38093733
##   tBodyGyro-arCoeff()-Y,4 tBodyGyro-arCoeff()-Z,1 tBodyGyro-arCoeff()-Z,2
## 1              0.37572641              0.72339919              -0.7711120
## 2              0.08169129              0.04236404              -0.1499284
## 3              0.12539829              0.11209205              -0.1656450
## 4              0.17702758              0.19340165              -0.2071888
## 5              0.65013677              0.23995007              -0.3395292
## 6              0.57330854              0.10377464              -0.2276797
##   tBodyGyro-arCoeff()-Z,3 tBodyGyro-arCoeff()-Z,4 tBodyGyro-correlation()-X,Y
## 1               0.6902132              -0.3318310                  0.70958377
## 2               0.2926189              -0.1494293                  0.04672124
## 3               0.1345544               0.1843490                 -0.01012957
## 4               0.1124575               0.2020919                  0.21019413
## 5               0.1325371               0.4732514                 -0.14200070
## 6               0.1382413               0.3461755                 -0.44810249
##   tBodyGyro-correlation()-X,Z tBodyGyro-correlation()-Y,Z
## 1                  0.13487336                   0.3010995
## 2                 -0.25692940                   0.1693948
## 3                  0.04331158                  -0.3506461
## 4                  0.14110084                  -0.7253011
## 5                  0.48441885                  -0.7245575
## 6                  0.64501358                  -0.7459792
##   tBodyGyroJerk-mean()-X tBodyGyroJerk-mean()-Y tBodyGyroJerk-mean()-Z
## 1            -0.09916740            -0.05551737            -0.06198580
## 2            -0.11050283            -0.04481873            -0.05924282
## 3            -0.10848567            -0.04241031            -0.05582883
## 4            -0.09116989            -0.03633262            -0.06046466
## 5            -0.09077010            -0.03763253            -0.05828932
## 6            -0.09424758            -0.04335526            -0.04193600
##   tBodyGyroJerk-std()-X tBodyGyroJerk-std()-Y tBodyGyroJerk-std()-Z
## 1            -0.9921107            -0.9925193            -0.9920553
## 2            -0.9898726            -0.9972926            -0.9938510
## 3            -0.9884618            -0.9956321            -0.9915318
## 4            -0.9911194            -0.9966410            -0.9933289
## 5            -0.9913545            -0.9964730            -0.9945110
## 6            -0.9916216            -0.9960147            -0.9930906
##   tBodyGyroJerk-mad()-X tBodyGyroJerk-mad()-Y tBodyGyroJerk-mad()-Z
## 1            -0.9921648            -0.9949416            -0.9926190
## 2            -0.9898762            -0.9974917            -0.9937783
```

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## 3            -0.9878680            -0.9957250            -0.9915963
## 4            -0.9912405            -0.9969579            -0.9940195
## 5            -0.9928823            -0.9965406            -0.9943830
## 6            -0.9930196            -0.9960382            -0.9926340
##   tBodyGyroJerk-max()-X tBodyGyroJerk-max()-Y tBodyGyroJerk-max()-Z
## 1            -0.9901558            -0.9867428            -0.9920416
## 2            -0.9919469            -0.9977171            -0.9949208
## 3            -0.9933590            -0.9938002            -0.9889631
## 4            -0.9936763            -0.9938002            -0.9889631
## 5            -0.9798455            -0.9975093            -0.9934198
## 6            -0.9798455            -0.9975093            -0.9934198
##   tBodyGyroJerk-min()-X tBodyGyroJerk-min()-Y tBodyGyroJerk-min()-Z
## 1             0.9944288             0.9917558             0.9893519
## 2             0.9904860             0.9971222             0.9945031
## 3             0.9892905             0.9971222             0.9941426
## 4             0.9892905             0.9981303             0.9941426
## 5             0.9936848             0.9974531             0.9965279
## 6             0.9938443             0.9974531             0.9965279
##   tBodyGyroJerk-sma() tBodyGyroJerk-energy()-X tBodyGyroJerk-energy()-Y
## 1          -0.9944534               -0.9999375               -0.9999535
## 2          -0.9952984               -0.9999077               -0.9999897
## 3          -0.9934149               -0.9998871               -0.9999798
## 4          -0.9954961               -0.9999251               -0.9999862
## 5          -0.9958778               -0.9999280               -0.9999852
## 6          -0.9952321               -0.9999316               -0.9999824
##   tBodyGyroJerk-energy()-Z tBodyGyroJerk-iqr()-X tBodyGyroJerk-iqr()-Y
## 1               -0.9999229            -0.9922997            -0.9969389
## 2               -0.9999459            -0.9907418            -0.9973013
## 3               -0.9999158            -0.9871304            -0.9954278
## 4               -0.9999396            -0.9909086            -0.9970785
## 5               -0.9999535            -0.9945132            -0.9967177
## 6               -0.9999362            -0.9937336            -0.9961224
##   tBodyGyroJerk-iqr()-Z tBodyGyroJerk-entropy()-X tBodyGyroJerk-entropy()-Y
## 1            -0.9922430                -0.5898510                -0.6884590
## 2            -0.9938078                -0.6009445                -0.7482472
## 3            -0.9927755                -0.5436348                -0.6729573
## 4            -0.9954046                -0.5620311                -0.7313321
## 5            -0.9939689                -0.6177378                -0.6830932
## 6            -0.9919696                -0.6278635                -0.6805905
##   tBodyGyroJerk-entropy()-Z tBodyGyroJerk-arCoeff()-X,1
## 1                -0.5721069                0.292376340
## 2                -0.6089321               -0.193307570
## 3                -0.5884104               -0.241150980
## 4                -0.6614345                0.009894985
## 5                -0.6329272               -0.025678521
## 6                -0.5418971               -0.265496090
##   tBodyGyroJerk-arCoeff()-X,2 tBodyGyroJerk-arCoeff()-X,3
## 1                -0.36199802                 0.40554269
## 2                -0.06740646                 0.18561907
## 3                -0.01137728                 0.11613363
## 4                -0.13757147                 0.12596517
## 5                -0.18813916                 0.23094957
## 6                 0.05580409                -0.04563533
##   tBodyGyroJerk-arCoeff()-X,4 tBodyGyroJerk-arCoeff()-Y,1
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## 1                 -0.03900695                  0.98928381
## 2                  0.04152181                  0.07235255
## 3                  0.08962988                  0.09598603
## 4                  0.31611970                  0.09433295
## 5                  0.20025838                 -0.14940028
## 6                  0.23627625                 -0.12219895
##   tBodyGyroJerk-arCoeff()-Y,2 tBodyGyroJerk-arCoeff()-Y,3
## 1                -0.414560480                  0.39160251
## 2                -0.035377727                  0.17760636
## 3                 0.009604215                  0.09512614
## 4                 0.026171325                  0.06966099
## 5                 0.271977090                 -0.27151547
## 6                 0.268114140                 -0.19369246
##   tBodyGyroJerk-arCoeff()-Y,4 tBodyGyroJerk-arCoeff()-Z,1
## 1                 0.282250870                   0.9272698
## 2                 0.027498054                   0.1827027
## 3                 0.252887040                   0.1816489
## 4                 0.246653200                   0.2573553
## 5                -0.009937466                   0.2351285
## 6                -0.005319577                   0.2034059
##   tBodyGyroJerk-arCoeff()-Z,2 tBodyGyroJerk-arCoeff()-Z,3
## 1                  -0.5723700                  0.69161920
## 2                  -0.1674574                  0.25325103
## 3                  -0.1693084                  0.13200906
## 4                  -0.1368088                  0.08731557
## 5                  -0.3409670                 -0.08571288
## 6                  -0.2967479                  0.06993358
##   tBodyGyroJerk-arCoeff()-Z,4 tBodyGyroJerk-correlation()-X,Y
## 1                 0.468289820                     -0.13107697
## 2                 0.132333860                      0.29385535
## 3                 0.008197317                      0.19332856
## 4                 0.149095580                      0.19665725
## 5                 0.163956800                      0.12059038
## 6                -0.012261880                      0.01791207
##   tBodyGyroJerk-correlation()-X,Z tBodyGyroJerk-correlation()-Y,Z
## 1                     -0.08715969                      0.3362475
## 2                     -0.01807517                     -0.3433368
## 3                      0.07371786                     -0.3148578
## 4                      0.14045188                     -0.3058977
## 5                      0.10748923                     -0.2825893
## 6                      0.18667289                     -0.3211694
##   tBodyAccMag-mean() tBodyAccMag-std() tBodyAccMag-mad() tBodyAccMag-max()
## 1        -0.9594339       -0.9505515       -0.9579929       -0.9463052
## 2        -0.9792892       -0.9760571       -0.9782473       -0.9787115
## 3        -0.9837031       -0.9880196       -0.9883268       -0.9864961
## 4        -0.9865418       -0.9864213       -0.9864305       -0.9864961
## 5        -0.9928271       -0.9912754       -0.9911703       -0.9909619
## 6        -0.9942950       -0.9952490       -0.9950094       -0.9957457
##   tBodyAccMag-min() tBodyAccMag-sma() tBodyAccMag-energy() tBodyAccMag-iqr()
## 1       -0.9925557       -0.9594339          -0.9984928       -0.9576374
## 2       -0.9953329       -0.9792892          -0.9994880       -0.9812483
## 3       -0.9953329       -0.9837031          -0.9996821       -0.9857669
## 4       -0.9970448       -0.9865418          -0.9997374       -0.9835088
## 5       -0.9970448       -0.9928271          -0.9998807       -0.9896081
```

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## 6        -0.9941746        -0.9942950           -0.9999199        -0.9934632
##   tBodyAccMag-entropy() tBodyAccMag-arCoeff()1 tBodyAccMag-arCoeff()2
## 1            -0.2325816            -0.17317874            -0.02289666
## 2            -0.4418761             0.08156863            -0.10936606
## 3            -0.5999393             0.03804910            -0.07421227
## 4            -0.5890063            -0.09285588             0.04639617
## 5            -0.7045988             0.18044105            -0.27765672
## 6            -0.7852715             0.37033862            -0.39345190
##   tBodyAccMag-arCoeff()3 tBodyAccMag-arCoeff()4 tGravityAccMag-mean()
## 1          0.0948315680             0.19181715            -0.9594339
## 2          0.3117577100            -0.41167480            -0.9792892
## 3          0.2540759900            -0.29612966            -0.9837031
## 4         -0.0004664473             0.03714251            -0.9865418
## 5          0.5155624300            -0.35585076            -0.9928271
## 6          0.5634830200            -0.48154569            -0.9942950
##   tGravityAccMag-std() tGravityAccMag-mad() tGravityAccMag-max()
## 1           -0.9505515           -0.9579929           -0.9463052
## 2           -0.9760571           -0.9782473           -0.9787115
## 3           -0.9880196           -0.9883268           -0.9864961
## 4           -0.9864213           -0.9864305           -0.9864961
## 5           -0.9912754           -0.9911703           -0.9909619
## 6           -0.9952490           -0.9950094           -0.9957457
##   tGravityAccMag-min() tGravityAccMag-sma() tGravityAccMag-energy()
## 1           -0.9925557           -0.9594339              -0.9984928
## 2           -0.9953329           -0.9792892              -0.9994880
## 3           -0.9953329           -0.9837031              -0.9996821
## 4           -0.9970448           -0.9865418              -0.9997374
## 5           -0.9970448           -0.9928271              -0.9998807
## 6           -0.9941746           -0.9942950              -0.9999199
##   tGravityAccMag-iqr() tGravityAccMag-entropy() tGravityAccMag-arCoeff()1
## 1           -0.9576374               -0.2325816               -0.17317874
## 2           -0.9812483               -0.4418761                0.08156863
## 3           -0.9857669               -0.5999393                0.03804910
## 4           -0.9835088               -0.5890063               -0.09285588
## 5           -0.9896081               -0.7045988                0.18044105
## 6           -0.9934632               -0.7852715                0.37033862
##   tGravityAccMag-arCoeff()2 tGravityAccMag-arCoeff()3 tGravityAccMag-arCoeff()4
## 1               -0.02289666              0.0948315680                0.19181715
## 2               -0.10936606              0.3117577100               -0.41167480
## 3               -0.07421227              0.2540759900               -0.29612966
## 4                0.04639617             -0.0004664473                0.03714251
## 5               -0.27765672              0.5155624300               -0.35585076
## 6               -0.39345190              0.5634830200               -0.48154569
##   tBodyAccJerkMag-mean() tBodyAccJerkMag-std() tBodyAccJerkMag-mad()
## 1             -0.9933059            -0.9943364            -0.9945004
## 2             -0.9912535            -0.9916944            -0.9927160
## 3             -0.9885313            -0.9903969            -0.9906505
## 4             -0.9930780            -0.9933808            -0.9931945
## 5             -0.9934800            -0.9958537            -0.9961075
## 6             -0.9930177            -0.9954243            -0.9955274
##   tBodyAccJerkMag-max() tBodyAccJerkMag-min() tBodyAccJerkMag-sma()
## 1            -0.9927840            -0.9912085            -0.9933059
## 2            -0.9886606            -0.9912085            -0.9912535
## 3            -0.9886606            -0.9930120            -0.9885313
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## 4            -0.9934017            -0.9930120            -0.9930780
## 5            -0.9932829            -0.9813245            -0.9934800
## 6            -0.9932829            -0.9931750            -0.9930177
##   tBodyAccJerkMag-energy() tBodyAccJerkMag-iqr() tBodyAccJerkMag-entropy()
## 1               -0.9998919           -0.9929337               -0.8634148
## 2               -0.9998454           -0.9934851               -0.8199283
## 3               -0.9997899           -0.9899838               -0.7948842
## 4               -0.9998836           -0.9917361               -0.7923214
## 5               -0.9999016           -0.9968463               -0.8500256
## 6               -0.9998927           -0.9950223               -0.8713030
##   tBodyAccJerkMag-arCoeff()1 tBodyAccJerkMag-arCoeff()2
## 1                 0.28308522               -0.23730869
## 2                 0.45881205               -0.24494134
## 3                 0.64970380               -0.26008800
## 4                 0.66160340               -0.24745115
## 5                 0.31160390               -0.17012088
## 6                 0.07270727                0.01781662
##   tBodyAccJerkMag-arCoeff()3 tBodyAccJerkMag-arCoeff()4 tBodyGyroMag-mean()
## 1               -0.10543219               -0.03821231          -0.9689591
## 2                0.05613927               -0.45834568          -0.9806831
## 3               -0.12841598               -0.52054112          -0.9763171
## 4               -0.23031491               -0.43645940          -0.9820599
## 5                0.13437035               -0.45829909          -0.9852037
## 6               -0.06858817               -0.16618196          -0.9858944
##   tBodyGyroMag-std() tBodyGyroMag-mad() tBodyGyroMag-max() tBodyGyroMag-min()
## 1         -0.9643352         -0.9572448         -0.9750599         -0.9915537
## 2         -0.9837542         -0.9820027         -0.9847146         -0.9915537
## 3         -0.9860515         -0.9844578         -0.9847146         -0.9661929
## 4         -0.9873511         -0.9856316         -0.9900291         -0.9816856
## 5         -0.9890626         -0.9896134         -0.9870285         -0.9816856
## 6         -0.9864403         -0.9863046         -0.9870285         -0.9903605
##   tBodyGyroMag-sma() tBodyGyroMag-energy() tBodyGyroMag-iqr()
## 1         -0.9689591            -0.9992865         -0.9497658
## 2         -0.9806831            -0.9997247         -0.9828568
## 3         -0.9763171            -0.9996406         -0.9834545
## 4         -0.9820599            -0.9997679         -0.9839660
## 5         -0.9852037            -0.9998294         -0.9923380
## 6         -0.9858944            -0.9998297         -0.9892783
##   tBodyGyroMag-entropy() tBodyGyroMag-arCoeff()1 tBodyGyroMag-arCoeff()2
## 1             0.07257904               0.5725114            -0.738602190
## 2            -0.19289906              -0.2253174            -0.017059623
## 3            -0.22282926              -0.2268309             0.059680819
## 4            -0.24071922              -0.2019850             0.054711916
## 5            -0.33869914              -0.2369926             0.093820007
## 6            -0.24494596              -0.1726625            -0.007801159
##   tBodyGyroMag-arCoeff()3 tBodyGyroMag-arCoeff()4 tBodyGyroJerkMag-mean()
## 1              0.21257776              0.43340495              -0.9942478
## 2              0.15577724              0.08257521              -0.9951232
## 3              0.06147618              0.04170213              -0.9934032
## 4              0.11007156             -0.07942259              -0.9955022
## 5              0.02333272              0.03903898              -0.9958076
## 6              0.09589124              0.06975596              -0.9952748
##   tBodyGyroJerkMag-std() tBodyGyroJerkMag-mad() tBodyGyroJerkMag-max()
## 1             -0.9913676             -0.9931430             -0.9889356
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## 2             -0.9961016             -0.9958385             -0.9965449
## 3             -0.9950910             -0.9948595             -0.9953595
## 4             -0.9952666             -0.9953048             -0.9953595
## 5             -0.9952580             -0.9963073             -0.9923893
## 6             -0.9952050             -0.9960696             -0.9923893
##   tBodyGyroJerkMag-min() tBodyGyroJerkMag-sma() tBodyGyroJerkMag-energy()
## 1             -0.9934860             -0.9942478               -0.9999490
## 2             -0.9920060             -0.9951232               -0.9999698
## 3             -0.9976518             -0.9934032               -0.9999549
## 4             -0.9976518             -0.9955022               -0.9999702
## 5             -0.9921927             -0.9958076               -0.9999721
## 6             -0.9927537             -0.9952748               -0.9999686
##   tBodyGyroJerkMag-iqr() tBodyGyroJerkMag-entropy() tBodyGyroJerkMag-arCoeff()1
## 1             -0.9945472                -0.6197676                   0.2928405
## 2             -0.9948192                -0.7307216                   0.2093341
## 3             -0.9939883                -0.6629136                   0.3280315
## 4             -0.9950011                -0.6830162                   0.5953713
## 5             -0.9964837                -0.7201707                   0.3318584
## 6             -0.9961068                -0.7510922                   0.1787599
##   tBodyGyroJerkMag-arCoeff()2 tBodyGyroJerkMag-arCoeff()3
## 1                  -0.1768892                -0.14577921
## 2                  -0.1781126                -0.10308433
## 3                  -0.1545600                -0.22058712
## 4                  -0.2645688                -0.31572300
## 5                  -0.2605620                -0.14566464
## 6                  -0.1814449                 0.04957464
##   tBodyGyroJerkMag-arCoeff()4 fBodyAcc-mean()-X fBodyAcc-mean()-Y
## 1               -0.124072330        -0.9947832        -0.9829841
## 2               -0.043823965        -0.9974507        -0.9768517
## 3               -0.107514160        -0.9935941        -0.9725115
## 4               -0.163825530        -0.9954906        -0.9835697
## 5               -0.007367991        -0.9972859        -0.9823010
## 6               -0.168852760        -0.9966567        -0.9869395
##   fBodyAcc-mean()-Z fBodyAcc-std()-X fBodyAcc-std()-Y fBodyAcc-std()-Z
## 1        -0.9392687       -0.9954217       -0.9831330       -0.9061650
## 2        -0.9735227       -0.9986803       -0.9749298       -0.9554381
## 3        -0.9833040       -0.9963128       -0.9655059       -0.9770493
## 4        -0.9910798       -0.9963121       -0.9832444       -0.9902291
## 5        -0.9883694       -0.9986065       -0.9801295       -0.9919150
## 6        -0.9927386       -0.9976438       -0.9922637       -0.9970459
##   fBodyAcc-mad()-X fBodyAcc-mad()-Y fBodyAcc-mad()-Z fBodyAcc-max()-X
## 1       -0.9968886       -0.9845193       -0.9320820       -0.9937563
## 2       -0.9978897       -0.9769239       -0.9683768       -0.9993717
## 3       -0.9940974       -0.9716867       -0.9821691       -0.9981585
## 4       -0.9945468       -0.9828241       -0.9890073       -0.9974035
## 5       -0.9977250       -0.9823528       -0.9909146       -0.9992774
## 6       -0.9966048       -0.9898989       -0.9950483       -0.9985979
##   fBodyAcc-max()-Y fBodyAcc-max()-Z fBodyAcc-min()-X fBodyAcc-min()-Y
## 1       -0.9831629       -0.8850542       -0.9939619       -0.9934461
## 2       -0.9737703       -0.9487768       -0.9982806       -0.9927209
## 3       -0.9630718       -0.9685959       -0.9970937       -0.9899236
## 4       -0.9872749       -0.9877543       -0.9944319       -0.9902589
## 5       -0.9808482       -0.9891165       -0.9949679       -0.9917884
## 6       -0.9934144       -0.9983060       -0.9956786       -0.9952322
```

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##   fBodyAcc-min()-Z fBodyAcc-sma() fBodyAcc-energy()-X fBodyAcc-energy()-Y
## 1       -0.9234277     -0.9747327          -0.9999684          -0.9996891
## 2       -0.9895135     -0.9858116          -0.9999908          -0.9994499
## 3       -0.9908857     -0.9858213          -0.9999693          -0.9991374
## 4       -0.9965778     -0.9928120          -0.9999754          -0.9996969
## 5       -0.9744938     -0.9924232          -0.9999902          -0.9996251
## 6       -0.9863281     -0.9950023          -0.9999849          -0.9998596
##   fBodyAcc-energy()-Z fBodyAcc-iqr()-X fBodyAcc-iqr()-Y fBodyAcc-iqr()-Z
## 1          -0.9948915       -0.9959260       -0.9897089       -0.9879912
## 2          -0.9985691       -0.9948649       -0.9807836       -0.9857747
## 3          -0.9994336       -0.9885692       -0.9772424       -0.9813019
## 4          -0.9998029       -0.9904425       -0.9919019       -0.9880605
## 5          -0.9997979       -0.9937604       -0.9881797       -0.9863589
## 6          -0.9999139       -0.9948238       -0.9869223       -0.9878261
##   fBodyAcc-entropy()-X fBodyAcc-entropy()-Y fBodyAcc-entropy()-Z
## 1           -0.9463569           -0.9047478           -0.5913025
## 2           -1.0000000           -0.9047478           -0.7584085
## 3           -1.0000000           -0.8157863           -0.8135133
## 4           -1.0000000           -0.8703979           -0.9441902
## 5           -1.0000000           -0.8703979           -0.9441902
## 6           -1.0000000           -0.9448704           -1.0000000
##   fBodyAcc-maxInds-X fBodyAcc-maxInds-Y fBodyAcc-maxInds-Z
## 1        -1.00000000                 -1                 -1
## 2         0.09677419                 -1                 -1
## 3        -0.93548387                 -1                 -1
## 4        -1.00000000                 -1                 -1
## 5         0.09677419                 -1                 -1
## 6        -0.61290323                 -1                 -1
##   fBodyAcc-meanFreq()-X fBodyAcc-meanFreq()-Y fBodyAcc-meanFreq()-Z
## 1            0.25248290            0.13183575           -0.05205025
## 2            0.27130855            0.04286364           -0.01430976
## 3            0.12453124           -0.06461056            0.08267692
## 4            0.02904438            0.08030227            0.18569468
## 5            0.18108977            0.05798789            0.55978632
## 6            0.15738377            0.31883523            0.60559943
##   fBodyAcc-skewness()-X fBodyAcc-kurtosis()-X fBodyAcc-skewness()-Y
## 1             0.1420506            -0.1506825            -0.2205469
## 2            -0.6925409            -0.9540470            -0.0497091
## 3            -0.7272273            -0.9654192             0.1630629
## 4            -0.5991180            -0.9084493            -0.4609145
## 5            -0.6769965            -0.9513707            -0.1803828
## 6            -0.6310530            -0.9349031            -0.6607821
##   fBodyAcc-kurtosis()-Y fBodyAcc-skewness()-Z fBodyAcc-kurtosis()-Z
## 1           -0.55873853            0.24676868          -0.007415521
## 2           -0.33197386            0.05667537          -0.289001440
## 3           -0.09215279           -0.04493677          -0.288365900
## 4           -0.81305675           -0.56683479          -0.771246060
## 5           -0.53372625           -0.58551700          -0.790432550
## 6           -0.89938137           -0.88068961          -0.963631110
##   fBodyAcc-bandsEnergy()-1,8 fBodyAcc-bandsEnergy()-9,16
## 1                 -0.9999628                  -0.9999865
## 2                 -0.9999962                  -0.9999818
## 3                 -0.9999894                  -0.9999616
## 4                 -0.9999886                  -0.9999767
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## 5                -0.9999940                  -0.9999860
## 6                -0.9999903                  -0.9999831
##   fBodyAcc-bandsEnergy()-17,24 fBodyAcc-bandsEnergy()-25,32
## 1                   -0.9999791                   -0.9999624
## 2                   -0.9999440                   -0.9999699
## 3                   -0.9998154                   -0.9998473
## 4                   -0.9998343                   -0.9998709
## 5                   -0.9999359                   -0.9999455
## 6                   -0.9999213                   -0.9999267
##   fBodyAcc-bandsEnergy()-33,40 fBodyAcc-bandsEnergy()-41,48
## 1                   -0.9999322                   -0.9997251
## 2                   -0.9999189                   -0.9998657
## 3                   -0.9999391                   -0.9999217
## 4                   -0.9999924                   -0.9999492
## 5                   -0.9999694                   -0.9999349
## 6                   -0.9999410                   -0.9999081
##   fBodyAcc-bandsEnergy()-49,56 fBodyAcc-bandsEnergy()-57,64
## 1                   -0.9996704                   -0.9999858
## 2                   -0.9999651                   -0.9999995
## 3                   -0.9999232                   -0.9999966
## 4                   -0.9999645                   -0.9999958
## 5                   -0.9999697                   -0.9999862
## 6                   -0.9999635                   -0.9999974
##   fBodyAcc-bandsEnergy()-1,16 fBodyAcc-bandsEnergy()-17,32
## 1                  -0.9999687                  -0.9999769
## 2                  -0.9999939                  -0.9999490
## 3                  -0.9999826                  -0.9998020
## 4                  -0.9999864                  -0.9998253
## 5                  -0.9999934                  -0.9999348
## 6                  -0.9999897                  -0.9999166
##   fBodyAcc-bandsEnergy()-33,48 fBodyAcc-bandsEnergy()-49,64
## 1                   -0.9998697                   -0.9997761
## 2                   -0.9999140                   -0.9999766
## 3                   -0.9999476                   -0.9999478
## 4                   -0.9999912                   -0.9999750
## 5                   -0.9999715                   -0.9999753
## 6                   -0.9999438                   -0.9999749
##   fBodyAcc-bandsEnergy()-1,24 fBodyAcc-bandsEnergy()-25,48
## 1                  -0.9999712                  -0.9999193
## 2                  -0.9999921                  -0.9999459
## 3                  -0.9999725                  -0.9998746
## 4                  -0.9999773                  -0.9999124
## 5                  -0.9999911                  -0.9999561
## 6                  -0.9999865                  -0.9999294
##   fBodyAcc-bandsEnergy()-1,8 fBodyAcc-bandsEnergy()-9,16
## 1                 -0.9996568                 -0.9998605
## 2                 -0.9994166                 -0.9998133
## 3                 -0.9990060                 -0.9997153
## 4                 -0.9997191                 -0.9997498
## 5                 -0.9995640                 -0.9998597
## 6                 -0.9998785                 -0.9999271
##   fBodyAcc-bandsEnergy()-17,24 fBodyAcc-bandsEnergy()-25,32
## 1                   -0.9998670                   -0.9998630
## 2                   -0.9995686                   -0.9998737
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## 3                   -0.9996577                   -0.9998174
## 4                   -0.9999442                   -0.9999397
## 5                   -0.9998627                   -0.9998976
## 6                   -0.9998145                   -0.9997641
##   fBodyAcc-bandsEnergy()-33,40 fBodyAcc-bandsEnergy()-41,48
## 1                   -0.9997378                   -0.9997322
## 2                   -0.9995489                   -0.9997371
## 3                   -0.9996359                   -0.9996789
## 4                   -0.9995535                   -0.9998987
## 5                   -0.9996505                   -0.9997118
## 6                   -0.9998370                   -0.9997239
##   fBodyAcc-bandsEnergy()-49,56 fBodyAcc-bandsEnergy()-57,64
## 1                   -0.9994926                   -0.9998136
## 2                   -0.9995658                   -0.9999053
## 3                   -0.9996157                   -0.9998796
## 4                   -0.9995122                   -0.9998656
## 5                   -0.9995164                   -0.9999108
## 6                   -0.9996215                   -0.9999073
##   fBodyAcc-bandsEnergy()-1,16 fBodyAcc-bandsEnergy()-17,32
## 1                  -0.9996818                  -0.9998394
## 2                  -0.9994735                  -0.9995542
## 3                  -0.9991085                  -0.9996240
## 4                  -0.9996727                  -0.9999362
## 5                  -0.9996103                  -0.9998453
## 6                  -0.9998860                  -0.9997602
##   fBodyAcc-bandsEnergy()-33,48 fBodyAcc-bandsEnergy()-49,64
## 1                   -0.9997382                   -0.9996120
## 2                   -0.9996020                   -0.9996953
## 3                   -0.9996433                   -0.9997150
## 4                   -0.9996673                   -0.9996458
## 5                   -0.9996666                   -0.9996675
## 6                   -0.9998075                   -0.9997302
##   fBodyAcc-bandsEnergy()-1,24 fBodyAcc-bandsEnergy()-25,48
## 1                  -0.9996872                  -0.9998386
## 2                  -0.9994442                  -0.9998042
## 3                  -0.9991263                  -0.9997753
## 4                  -0.9996925                  -0.9998733
## 5                  -0.9996211                  -0.9998419
## 6                  -0.9998646                  -0.9997870
##   fBodyAcc-bandsEnergy()-1,8 fBodyAcc-bandsEnergy()-9,16
## 1                 -0.9935923                 -0.9994758
## 2                 -0.9982346                 -0.9997692
## 3                 -0.9993882                 -0.9997249
## 4                 -0.9998071                 -0.9997748
## 5                 -0.9998057                 -0.9998344
## 6                 -0.9999423                 -0.9998171
##   fBodyAcc-bandsEnergy()-17,24 fBodyAcc-bandsEnergy()-25,32
## 1                   -0.9996620                   -0.9996423
## 2                   -0.9996922                   -0.9998749
## 3                   -0.9997185                   -0.9997982
## 4                   -0.9998102                   -0.9999293
## 5                   -0.9998251                   -0.9997864
## 6                   -0.9998803                   -0.9998224
##   fBodyAcc-bandsEnergy()-33,40 fBodyAcc-bandsEnergy()-41,48
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## 1                   -0.9992934                   -0.9978922
## 2                   -0.9996656                   -0.9994483
## 3                   -0.9997528                   -0.9996292
## 4                   -0.9998582                   -0.9996655
## 5                   -0.9997453                   -0.9996557
## 6                   -0.9997649                   -0.9994852
##   fBodyAcc-bandsEnergy()-49,56 fBodyAcc-bandsEnergy()-57,64
## 1                   -0.9959325                   -0.9951464
## 2                   -0.9989302                   -0.9987544
## 3                   -0.9996862                   -0.9999119
## 4                   -0.9996813                   -0.9999836
## 5                   -0.9990258                   -0.9994359
## 6                   -0.9996778                   -0.9999048
##   fBodyAcc-bandsEnergy()-1,16 fBodyAcc-bandsEnergy()-17,32
## 1                  -0.9947399                  -0.9996883
## 2                  -0.9985456                  -0.9997918
## 3                  -0.9994535                  -0.9997807
## 4                  -0.9998044                  -0.9998867
## 5                  -0.9998225                  -0.9998445
## 6                  -0.9999262                  -0.9998927
##   fBodyAcc-bandsEnergy()-33,48 fBodyAcc-bandsEnergy()-49,64
## 1                   -0.9989246                   -0.9956713
## 2                   -0.9996312                   -0.9988775
## 3                   -0.9997489                   -0.9997604
## 4                   -0.9998438                   -0.9997784
## 5                   -0.9997497                   -0.9991496
## 6                   -0.9997213                   -0.9997523
##   fBodyAcc-bandsEnergy()-1,24 fBodyAcc-bandsEnergy()-25,48
## 1                  -0.9948773                  -0.9994544
## 2                  -0.9985534                  -0.9998221
## 3                  -0.9994343                  -0.9998009
## 4                  -0.9997918                  -0.9999217
## 5                  -0.9998123                  -0.9997927
## 6                  -0.9999238                  -0.9998103
##   fBodyAccJerk-mean()-X fBodyAccJerk-mean()-Y fBodyAccJerk-mean()-Z
## 1            -0.9923325            -0.9871699            -0.9896961
## 2            -0.9950322            -0.9813115            -0.9897398
## 3            -0.9909937            -0.9816423            -0.9875663
## 4            -0.9944466            -0.9887272            -0.9913542
## 5            -0.9962920            -0.9887900            -0.9906244
## 6            -0.9948507            -0.9882443            -0.9901575
##   fBodyAccJerk-std()-X fBodyAccJerk-std()-Y fBodyAccJerk-std()-Z
## 1           -0.9958207           -0.9909363           -0.9970517
## 2           -0.9966523           -0.9820839           -0.9926268
## 3           -0.9912488           -0.9814148           -0.9904159
## 4           -0.9913783           -0.9869269           -0.9943908
## 5           -0.9969025           -0.9886067           -0.9929065
## 6           -0.9952180           -0.9901788           -0.9930667
##   fBodyAccJerk-mad()-X fBodyAccJerk-mad()-Y fBodyAccJerk-mad()-Z
## 1           -0.9938055           -0.9905187           -0.9969928
## 2           -0.9949767           -0.9829295           -0.9916414
## 3           -0.9877510           -0.9810912           -0.9877232
## 4           -0.9894309           -0.9871450           -0.9937904
## 5           -0.9960914           -0.9888672           -0.9916730
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## 6           -0.9931267           -0.9898364           -0.9918185
##   fBodyAccJerk-max()-X fBodyAccJerk-max()-Y fBodyAccJerk-max()-Z
## 1           -0.9967369           -0.9919752           -0.9932417
## 2           -0.9974245           -0.9849232           -0.9931870
## 3           -0.9951632           -0.9853508           -0.9939116
## 4           -0.9934019           -0.9878742           -0.9942012
## 5           -0.9970095           -0.9903728           -0.9951421
## 6           -0.9969799           -0.9928015           -0.9942166
##   fBodyAccJerk-min()-X fBodyAccJerk-min()-Y fBodyAccJerk-min()-Z
## 1           -0.9983491           -0.9911084           -0.9598854
## 2           -0.9979168           -0.9825186           -0.9868384
## 3           -0.9974823           -0.9985712           -0.9975540
## 4           -0.9979030           -0.9997671           -0.9653808
## 5           -0.9957965           -0.9961128           -0.9959788
## 6           -0.9960982           -0.9990643           -0.9848585
##   fBodyAccJerk-sma() fBodyAccJerk-energy()-X fBodyAccJerk-energy()-Y
## 1         -0.9905150              -0.9999347              -0.9998205
## 2         -0.9898509              -0.9999596              -0.9996396
## 3         -0.9872372              -0.9998940              -0.9996366
## 4         -0.9926573              -0.9999235              -0.9998031
## 5         -0.9932588              -0.9999691              -0.9998205
## 6         -0.9922249              -0.9999511              -0.9998280
##   fBodyAccJerk-energy()-Z fBodyAccJerk-iqr()-X fBodyAccJerk-iqr()-Y
## 1              -0.9998845           -0.9930263           -0.9913734
## 2              -0.9998466           -0.9928434           -0.9852207
## 3              -0.9997951           -0.9818169           -0.9847648
## 4              -0.9998830           -0.9917761           -0.9906849
## 5              -0.9998604           -0.9961415           -0.9924077
## 6              -0.9998562           -0.9913534           -0.9910572
##   fBodyAccJerk-iqr()-Z fBodyAccJerk-entropy()-X fBodyAccJerk-entropy()-Y
## 1           -0.9962396                       -1                       -1
## 2           -0.9910493                       -1                       -1
## 3           -0.9823642                       -1                       -1
## 4           -0.9932884                       -1                       -1
## 5           -0.9861788                       -1                       -1
## 6           -0.9877527                       -1                       -1
##   fBodyAccJerk-entropy()-Z fBodyAccJerk-maxInds-X fBodyAccJerk-maxInds-Y
## 1                       -1                 1.00                 -0.24
## 2                       -1                -0.32                 -0.12
## 3                       -1                -0.16                 -0.48
## 4                       -1                -0.12                 -0.56
## 5                       -1                -0.32                 -0.08
## 6                       -1                -0.32                 -0.36
##   fBodyAccJerk-maxInds-Z fBodyAccJerk-meanFreq()-X fBodyAccJerk-meanFreq()-Y
## 1                  -1.00                0.87038451                0.21069700
## 2                  -0.32                0.60851352               -0.05367561
## 3                  -0.28                0.11543400               -0.19343634
## 4                  -0.28                0.03579805               -0.09303585
## 5                   0.04                0.27335020                0.07913538
## 6                   0.52                0.32883589                0.05477140
##   fBodyAccJerk-meanFreq()-Z fBodyAccJerk-skewness()-X fBodyAccJerk-kurtosis()-X
## 1                0.26370789               -0.7036858               -0.9037425
## 2                0.06314827               -0.6303049               -0.9103945
## 3                0.03825433               -0.5947588               -0.9235410
```

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## 4                0.16809523                -0.2638514                -0.7572285
## 5                0.29238418                -0.5221571                -0.8129873
## 6                0.32094497                -0.5946287                -0.9053384
##   fBodyAccJerk-skewness()-Y fBodyAccJerk-kurtosis()-Y fBodyAccJerk-skewness()-Z
## 1                -0.5825736                -0.9363101                -0.5073447
## 2                -0.4144235                -0.8505864                -0.6555347
## 3                -0.5289342                -0.9129851                -0.8034065
## 4                -0.3960393                -0.8296347                -0.5770384
## 5                -0.4965600                -0.9039084                -0.7643694
## 6                -0.6649723                -0.9564599                -0.7225990
##   fBodyAccJerk-kurtosis()-Z fBodyAccJerk-bandsEnergy()-1,8
## 1                -0.8055359                     -0.9999865
## 2                -0.9159869                     -0.9999963
## 3                -0.9801332                     -0.9999936
## 4                -0.8933748                     -0.9999978
## 5                -0.9662039                     -0.9999953
## 6                -0.9432911                     -0.9999878
##   fBodyAccJerk-bandsEnergy()-9,16 fBodyAccJerk-bandsEnergy()-17,24
## 1                     -0.9999796                      -0.9999748
## 2                     -0.9999797                      -0.9999489
## 3                     -0.9999443                      -0.9998274
## 4                     -0.9999651                      -0.9998432
## 5                     -0.9999829                      -0.9999466
## 6                     -0.9999855                      -0.9999309
##   fBodyAccJerk-bandsEnergy()-25,32 fBodyAccJerk-bandsEnergy()-33,40
## 1                      -0.9999551                       -0.9999186
## 2                      -0.9999683                       -0.9999101
## 3                      -0.9998414                       -0.9999222
## 4                      -0.9998654                       -0.9999959
## 5                      -0.9999388                       -0.9999616
## 6                      -0.9999155                       -0.9999256
##   fBodyAccJerk-bandsEnergy()-41,48 fBodyAccJerk-bandsEnergy()-49,56
## 1                      -0.9996401                       -0.9994833
## 2                      -0.9998137                       -0.9999203
## 3                      -0.9999058                       -0.9998736
## 4                      -0.9999304                       -0.9999417
## 5                      -0.9999289                       -0.9999581
## 6                      -0.9998590                       -0.9999402
##   fBodyAccJerk-bandsEnergy()-57,64 fBodyAccJerk-bandsEnergy()-1,16
## 1                      -0.9999609                      -0.9999823
## 2                      -0.9999607                      -0.9999867
## 3                      -0.9999965                      -0.9999628
## 4                      -0.9999992                      -0.9999781
## 5                      -0.9999949                      -0.9999883
## 6                      -0.9999969                      -0.9999866
##   fBodyAccJerk-bandsEnergy()-17,32 fBodyAccJerk-bandsEnergy()-33,48
## 1                      -0.9999707                       -0.9998110
## 2                      -0.9999560                       -0.9998767
## 3                      -0.9998038                       -0.9999227
## 4                      -0.9998269                       -0.9999824
## 5                      -0.9999412                       -0.9999587
## 6                      -0.9999185                       -0.9999058
##   fBodyAccJerk-bandsEnergy()-49,64 fBodyAccJerk-bandsEnergy()-1,24
## 1                      -0.9994847                      -0.9999808
```

```
## 2                       -0.9999141                       -0.9999744
## 3                       -0.9998752                       -0.9999085
## 4                       -0.9999426                       -0.9999268
## 5                       -0.9999579                       -0.9999748
## 6                       -0.9999407                       -0.9999674
##   fBodyAccJerk-bandsEnergy()-25,48 fBodyAccJerk-bandsEnergy()-1,8
## 1                       -0.9998519                      -0.9999326
## 2                       -0.9999058                      -0.9998610
## 3                       -0.9998430                      -0.9998203
## 4                       -0.9999009                      -0.9998950
## 5                       -0.9999391                      -0.9999254
## 6                       -0.9998864                      -0.9999001
##   fBodyAccJerk-bandsEnergy()-9,16 fBodyAccJerk-bandsEnergy()-17,24
## 1                      -0.9998999                       -0.9998244
## 2                      -0.9998272                       -0.9994565
## 3                      -0.9997439                       -0.9995591
## 4                      -0.9997965                       -0.9998881
## 5                      -0.9998775                       -0.9998104
## 6                      -0.9999422                       -0.9997838
##   fBodyAccJerk-bandsEnergy()-25,32 fBodyAccJerk-bandsEnergy()-33,40
## 1                       -0.9998598                       -0.9997275
## 2                       -0.9998303                       -0.9996093
## 3                       -0.9998386                       -0.9996673
## 4                       -0.9999061                       -0.9996812
## 5                       -0.9999321                       -0.9997284
## 6                       -0.9998103                       -0.9998735
##   fBodyAccJerk-bandsEnergy()-41,48 fBodyAccJerk-bandsEnergy()-49,56
## 1                       -0.9997288                       -0.9995671
## 2                       -0.9996855                       -0.9995761
## 3                       -0.9996275                       -0.9997037
## 4                       -0.9998463                       -0.9996932
## 5                       -0.9997694                       -0.9995027
## 6                       -0.9996886                       -0.9995826
##   fBodyAccJerk-bandsEnergy()-57,64 fBodyAccJerk-bandsEnergy()-1,16
## 1                       -0.9997652                      -0.9999002
## 2                       -0.9999370                      -0.9998174
## 3                       -0.9999934                      -0.9997323
## 4                       -0.9999999                      -0.9997976
## 5                       -0.9999921                      -0.9998782
## 6                       -0.9999992                      -0.9999309
##   fBodyAccJerk-bandsEnergy()-17,32 fBodyAccJerk-bandsEnergy()-33,48
## 1                       -0.9998149                       -0.9997098
## 2                       -0.9995325                       -0.9995952
## 3                       -0.9996112                       -0.9996175
## 4                       -0.9998832                       -0.9997223
## 5                       -0.9998387                       -0.9997279
## 6                       -0.9997619                       -0.9998114
##   fBodyAccJerk-bandsEnergy()-49,64 fBodyAccJerk-bandsEnergy()-1,24
## 1                       -0.9995961                      -0.9998522
## 2                       -0.9996257                      -0.9996299
## 3                       -0.9997442                      -0.9996132
## 4                       -0.9997359                      -0.9998056
## 5                       -0.9995684                      -0.9998299
## 6                       -0.9996392                      -0.9998566
```

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##   fBodyAccJerk-bandsEnergy()-25,48 fBodyAccJerk-bandsEnergy()-1,8
## 1                       -0.9998221                     -0.9993999
## 2                       -0.9997593                     -0.9998589
## 3                       -0.9997732                     -0.9998709
## 4                       -0.9998560                     -0.9998848
## 5                       -0.9998744                     -0.9998451
## 6                       -0.9998302                     -0.9998633
##   fBodyAccJerk-bandsEnergy()-9,16 fBodyAccJerk-bandsEnergy()-17,24
## 1                      -0.9997656                       -0.9999585
## 2                      -0.9998465                       -0.9997949
## 3                      -0.9997839                       -0.9997397
## 4                      -0.9997237                       -0.9998414
## 5                      -0.9998530                       -0.9998899
## 6                      -0.9997931                       -0.9999047
##   fBodyAccJerk-bandsEnergy()-25,32 fBodyAccJerk-bandsEnergy()-33,40
## 1                       -0.9999495                       -0.9998385
## 2                       -0.9998009                       -0.9998193
## 3                       -0.9997866                       -0.9997722
## 4                       -0.9999425                       -0.9998694
## 5                       -0.9998177                       -0.9997595
## 6                       -0.9998218                       -0.9997550
##   fBodyAccJerk-bandsEnergy()-41,48 fBodyAccJerk-bandsEnergy()-49,56
## 1                       -0.9998135                       -0.9987805
## 2                       -0.9997692                       -0.9996370
## 3                       -0.9996260                       -0.9994874
## 4                       -0.9997353                       -0.9992040
## 5                       -0.9996878                       -0.9991695
## 6                       -0.9996238                       -0.9993829
##   fBodyAccJerk-bandsEnergy()-57,64 fBodyAccJerk-bandsEnergy()-1,16
## 1                       -0.9985778                     -0.9996197
## 2                       -0.9999545                     -0.9998519
## 3                       -0.9999957                     -0.9998025
## 4                       -0.9996620                     -0.9997560
## 5                       -0.9999823                     -0.9998525
## 6                       -0.9999102                     -0.9998077
##   fBodyAccJerk-bandsEnergy()-17,32 fBodyAccJerk-bandsEnergy()-33,48
## 1                       -0.9999836                       -0.9998281
## 2                       -0.9998273                       -0.9998001
## 3                       -0.9997921                       -0.9997208
## 4                       -0.9999203                       -0.9998281
## 5                       -0.9998841                       -0.9997297
## 6                       -0.9998937                       -0.9997069
##   fBodyAccJerk-bandsEnergy()-49,64 fBodyAccJerk-bandsEnergy()-1,24
## 1                       -0.9986807                     -0.9998442
## 2                       -0.9996510                     -0.9998350
## 3                       -0.9995138                     -0.9997753
## 4                       -0.9992066                     -0.9998244
## 5                       -0.9992106                     -0.9999004
## 6                       -0.9994048                     -0.9998907
##   fBodyAccJerk-bandsEnergy()-25,48 fBodyGyro-mean()-X fBodyGyro-mean()-Y
## 1                       -0.9999279         -0.9865744         -0.9817615
## 2                       -0.9998267         -0.9773867         -0.9925300
## 3                       -0.9997868         -0.9754332         -0.9937147
## 4                       -0.9999237         -0.9871096         -0.9936015
```

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## 5                      -0.9998092         -0.9824465         -0.9929838
## 6                      -0.9998027         -0.9848902         -0.9927862
##   fBodyGyro-mean()-Z fBodyGyro-std()-X fBodyGyro-std()-Y fBodyGyro-std()-Z
## 1         -0.9895148        -0.9850326        -0.9738861        -0.9940349
## 2         -0.9896058        -0.9849043        -0.9871681        -0.9897847
## 3         -0.9867557        -0.9766422        -0.9933990        -0.9873282
## 4         -0.9871913        -0.9928104        -0.9916460        -0.9886776
## 5         -0.9886664        -0.9859818        -0.9919558        -0.9879443
## 6         -0.9807784        -0.9852871        -0.9916595        -0.9853661
##   fBodyGyro-mad()-X fBodyGyro-mad()-Y fBodyGyro-mad()-Z fBodyGyro-max()-X
## 1        -0.9865308        -0.9836164        -0.9923520        -0.9804984
## 2        -0.9793612        -0.9918368        -0.9879651        -0.9873538
## 3        -0.9756091        -0.9937071        -0.9850303        -0.9729012
## 4        -0.9896713        -0.9934607        -0.9865264        -0.9945184
## 5        -0.9825810        -0.9933426        -0.9864612        -0.9879502
## 6        -0.9834343        -0.9929105        -0.9840883        -0.9829656
##   fBodyGyro-max()-Y fBodyGyro-max()-Z fBodyGyro-min()-X fBodyGyro-min()-Y
## 1        -0.9722709        -0.9949443        -0.9975686        -0.9840851
## 2        -0.9847864        -0.9901508        -0.9868918        -0.9990535
## 3        -0.9949860        -0.9912830        -0.9883117        -0.9972327
## 4        -0.9918014        -0.9922807        -0.9897006        -0.9943438
## 5        -0.9932283        -0.9914436        -0.9937381        -0.9937253
## 6        -0.9931990        -0.9876443        -0.9993609        -0.9978452
##   fBodyGyro-min()-Z fBodyGyro-sma() fBodyGyro-energy()-X fBodyGyro-energy()-Y
## 1        -0.9943354      -0.9852762           -0.9998637           -0.9996661
## 2        -0.9944137      -0.9868687           -0.9998249           -0.9999115
## 3        -0.9936360      -0.9860087           -0.9996733           -0.9999624
## 4        -0.9931436      -0.9903443           -0.9999462           -0.9999514
## 5        -0.9948352      -0.9887062           -0.9998616           -0.9999510
## 6        -0.9816007      -0.9876105           -0.9998615           -0.9999484
##   fBodyGyro-energy()-Z fBodyGyro-iqr()-X fBodyGyro-iqr()-Y fBodyGyro-iqr()-Z
## 1           -0.9999346        -0.9903439        -0.9948357        -0.9944116
## 2           -0.9998921        -0.9870994        -0.9955637        -0.9872545
## 3           -0.9998463        -0.9855365        -0.9953921        -0.9925506
## 4           -0.9998668        -0.9928778        -0.9962888        -0.9902236
## 5           -0.9998642        -0.9904644        -0.9961228        -0.9974263
## 6           -0.9997811        -0.9883218        -0.9940861        -0.9904452
##   fBodyGyro-entropy()-X fBodyGyro-entropy()-Y fBodyGyro-entropy()-Z
## 1            -0.7124023            -0.6448424            -0.8389930
## 2            -0.6111119            -0.7646030            -0.7510797
## 3            -0.5909865            -0.8082872            -0.7510797
## 4            -0.7236655            -0.8037541            -0.8172859
## 5            -0.6526168            -0.8272124            -0.7374578
## 6            -0.6781863            -0.8082872            -0.7510797
##   fBodyGyro-maxInds-X fBodyGyro-maxInds-Y fBodyGyro-maxInds-Z
## 1          -1.0000000          -1.0000000          -1.0000000
## 2          -1.0000000          -1.0000000          -1.0000000
## 3          -1.0000000          -0.8709677          -1.0000000
## 4          -1.0000000          -1.0000000          -0.7931035
## 5          -1.0000000          -0.8064516          -1.0000000
## 6          -0.9333333          -0.9354839          -0.9310345
##   fBodyGyro-meanFreq()-X fBodyGyro-meanFreq()-Y fBodyGyro-meanFreq()-Z
## 1            -0.25754888             0.09794711             0.54715105
## 2            -0.04816744            -0.40160791            -0.06817833
```

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## 3            -0.21668507            -0.01726417            -0.11072029
## 4             0.21686246            -0.13524536            -0.04972798
## 5            -0.15334258            -0.08840273            -0.16223039
## 6            -0.36303968            -0.13323831             0.19483324
##   fBodyGyro-skewness()-X fBodyGyro-kurtosis()-X fBodyGyro-skewness()-Y
## 1            0.377311210             0.1340915              0.2733720
## 2           -0.458553310            -0.7970135              0.3875689
## 3            0.090519474            -0.2446911             -0.4292724
## 4           -0.572087600            -0.8736179             -0.1351185
## 5           -0.339596820            -0.7226279             -0.2654707
## 6           -0.004027766            -0.3231587             -0.2900701
##   fBodyGyro-kurtosis()-Y fBodyGyro-skewness()-Z fBodyGyro-kurtosis()-Z
## 1            -0.09126183            -0.4843465             -0.7828507
## 2             0.14866483            -0.1569093             -0.4517759
## 3            -0.81263905            -0.3919913             -0.7674824
## 4            -0.54223840            -0.3793527             -0.7565483
## 5            -0.68998825            -0.2679956             -0.6592078
## 6            -0.70538442            -0.2350403             -0.6081425
##   fBodyGyro-bandsEnergy()-1,8 fBodyGyro-bandsEnergy()-9,16
## 1                  -0.9998650                   -0.9999318
## 2                  -0.9998509                   -0.9997943
## 3                  -0.9996805                   -0.9998282
## 4                  -0.9999637                   -0.9998907
## 5                  -0.9998700                   -0.9999117
## 6                  -0.9998650                   -0.9999123
##   fBodyGyro-bandsEnergy()-17,24 fBodyGyro-bandsEnergy()-25,32
## 1                    -0.9999729                    -0.9999702
## 2                    -0.9999131                    -0.9999182
## 3                    -0.9999151                    -0.9999324
## 4                    -0.9999465                    -0.9999733
## 5                    -0.9999258                    -0.9999409
## 6                    -0.9999742                    -0.9999722
##   fBodyGyro-bandsEnergy()-33,40 fBodyGyro-bandsEnergy()-41,48
## 1                    -0.9999301                    -0.9999586
## 2                    -0.9998964                    -0.9998853
## 3                    -0.9998478                    -0.9998415
## 4                    -0.9998773                    -0.9999031
## 5                    -0.9999356                    -0.9998874
## 6                    -0.9999759                    -0.9999721
##   fBodyGyro-bandsEnergy()-49,56 fBodyGyro-bandsEnergy()-57,64
## 1                    -0.9999290                    -0.9999847
## 2                    -0.9997842                    -0.9997824
## 3                    -0.9998635                    -0.9998622
## 4                    -0.9998334                    -0.9998929
## 5                    -0.9998999                    -0.9999175
## 6                    -0.9999598                    -0.9999847
##   fBodyGyro-bandsEnergy()-1,16 fBodyGyro-bandsEnergy()-17,32
## 1                   -0.9998633                    -0.9999681
## 2                   -0.9998299                    -0.9998988
## 3                   -0.9996744                    -0.9999063
## 4                   -0.9999502                    -0.9999481
## 5                   -0.9998651                    -0.9999183
## 6                   -0.9998604                    -0.9999700
##   fBodyGyro-bandsEnergy()-33,48 fBodyGyro-bandsEnergy()-49,64
```

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## 1                    -0.9999361                    -0.9999536
## 2                    -0.9998828                    -0.9997834
## 3                    -0.9998314                    -0.9998629
## 4                    -0.9998769                    -0.9998597
## 5                    -0.9999109                    -0.9999077
## 6                    -0.9999733                    -0.9999708
##   fBodyGyro-bandsEnergy()-1,24 fBodyGyro-bandsEnergy()-25,48
## 1                   -0.9998644                    -0.9999610
## 2                   -0.9998283                    -0.9999080
## 3                   -0.9996757                    -0.9999035
## 4                   -0.9999484                    -0.9999461
## 5                   -0.9998636                    -0.9999326
## 6                   -0.9998617                    -0.9999732
##   fBodyGyro-bandsEnergy()-1,8 fBodyGyro-bandsEnergy()-9,16
## 1                  -0.9994537                   -0.9999781
## 2                  -0.9998564                   -0.9999885
## 3                  -0.9999544                   -0.9999876
## 4                  -0.9999305                   -0.9999892
## 5                  -0.9999259                   -0.9999927
## 6                  -0.9999263                   -0.9999897
##   fBodyGyro-bandsEnergy()-17,24 fBodyGyro-bandsEnergy()-25,32
## 1                    -0.9999915                    -0.9999901
## 2                    -0.9999957                    -0.9999942
## 3                    -0.9999901                    -0.9999943
## 4                    -0.9999924                    -0.9999925
## 5                    -0.9999964                    -0.9999884
## 6                    -0.9999942                    -0.9999842
##   fBodyGyro-bandsEnergy()-33,40 fBodyGyro-bandsEnergy()-41,48
## 1                    -0.9999686                    -0.9998066
## 2                    -0.9999861                    -0.9999845
## 3                    -0.9999730                    -0.9999428
## 4                    -0.9999859                    -0.9999541
## 5                    -0.9999666                    -0.9999737
## 6                    -0.9999678                    -0.9999921
##   fBodyGyro-bandsEnergy()-49,56 fBodyGyro-bandsEnergy()-57,64
## 1                    -0.9983460                    -0.9989612
## 2                    -0.9999800                    -0.9999900
## 3                    -0.9999866                    -0.9999933
## 4                    -0.9999898                    -0.9999883
## 5                    -0.9999740                    -0.9999720
## 6                    -0.9999660                    -0.9999886
##   fBodyGyro-bandsEnergy()-1,16 fBodyGyro-bandsEnergy()-17,32
## 1                   -0.9996187                   -0.9999893
## 2                   -0.9998966                   -0.9999945
## 3                   -0.9999620                   -0.9999893
## 4                   -0.9999470                   -0.9999908
## 5                   -0.9999462                   -0.9999934
## 6                   -0.9999445                   -0.9999900
##   fBodyGyro-bandsEnergy()-33,48 fBodyGyro-bandsEnergy()-49,64
## 1                    -0.9999354                    -0.9983875
## 2                    -0.9999860                    -0.9999817
## 3                    -0.9999670                    -0.9999877
## 4                    -0.9999796                    -0.9999878
## 5                    -0.9999681                    -0.9999696
```

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## 6                    -0.9999729                    -0.9999712
##   fBodyGyro-bandsEnergy()-1,24 fBodyGyro-bandsEnergy()-25,48
## 1                   -0.9996426                    -0.9999727
## 2                   -0.9999026                    -0.9999917
## 3                   -0.9999606                    -0.9999858
## 4                   -0.9999478                    -0.9999884
## 5                   -0.9999490                    -0.9999816
## 6                   -0.9999463                    -0.9999799
##   fBodyGyro-bandsEnergy()-1,8 fBodyGyro-bandsEnergy()-9,16
## 1                  -0.9999554                   -0.9999763
## 2                  -0.9999089                   -0.9999594
## 3                  -0.9998701                   -0.9999346
## 4                  -0.9998773                   -0.9999685
## 5                  -0.9998711                   -0.9999554
## 6                  -0.9998227                   -0.9998868
##   fBodyGyro-bandsEnergy()-17,24 fBodyGyro-bandsEnergy()-25,32
## 1                    -0.9999058                    -0.9999855
## 2                    -0.9999281                    -0.9999663
## 3                    -0.9999347                    -0.9999570
## 4                    -0.9999566                    -0.9999556
## 5                    -0.9999962                    -0.9999864
## 6                    -0.9999526                    -0.9999220
##   fBodyGyro-bandsEnergy()-33,40 fBodyGyro-bandsEnergy()-41,48
## 1                    -0.9999372                    -0.9997512
## 2                    -0.9999855                    -0.9999264
## 3                    -0.9999522                    -0.9999093
## 4                    -0.9999493                    -0.9998805
## 5                    -0.9999397                    -0.9999068
## 6                    -0.9998569                    -0.9998545
##   fBodyGyro-bandsEnergy()-49,56 fBodyGyro-bandsEnergy()-57,64
## 1                    -0.9990723                    -0.9999275
## 2                    -0.9999615                    -0.9999831
## 3                    -0.9998890                    -0.9999885
## 4                    -0.9998793                    -0.9999495
## 5                    -0.9999211                    -0.9999812
## 6                    -0.9995571                    -0.9996430
##   fBodyGyro-bandsEnergy()-1,16 fBodyGyro-bandsEnergy()-17,32
## 1                   -0.9999516                   -0.9999058
## 2                   -0.9999017                   -0.9999178
## 3                   -0.9998565                   -0.9999196
## 4                   -0.9998747                   -0.9999398
## 5                   -0.9998645                   -0.9999925
## 6                   -0.9997954                   -0.9999197
##   fBodyGyro-bandsEnergy()-33,48 fBodyGyro-bandsEnergy()-49,64
## 1                    -0.9998927                    -0.9994443
## 2                    -0.9999754                    -0.9999711
## 3                    -0.9999464                    -0.9999325
## 4                    -0.9999364                    -0.9999101
## 5                    -0.9999366                    -0.9999474
## 6                    -0.9998617                    -0.9995947
##   fBodyGyro-bandsEnergy()-1,24 fBodyGyro-bandsEnergy()-25,48 fBodyAccMag-mean()
## 1                   -0.9999410                    -0.9999586         -0.9521547
## 2                   -0.9998943                    -0.9999710         -0.9808566
## 3                   -0.9998502                    -0.9999556         -0.9877948
```

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## 4                  -0.9998713                   -0.9999516         -0.9875187
## 5                  -0.9998664                   -0.9999728         -0.9935909
## 6                  -0.9997918                   -0.9999052         -0.9948360
##   fBodyAccMag-std() fBodyAccMag-mad() fBodyAccMag-max() fBodyAccMag-min()
## 1        -0.9561340        -0.9488701        -0.9743206        -0.9257218
## 2        -0.9758658        -0.9757769        -0.9782264        -0.9869108
## 3        -0.9890155        -0.9855936        -0.9930619        -0.9898364
## 4        -0.9867420        -0.9835237        -0.9902299        -0.9981850
## 5        -0.9900635        -0.9923241        -0.9905059        -0.9878052
## 6        -0.9952833        -0.9938512        -0.9953650        -0.9894722
##   fBodyAccMag-sma() fBodyAccMag-energy() fBodyAccMag-iqr()
## 1        -0.9521547           -0.9982852        -0.9732732
## 2        -0.9808566           -0.9994719        -0.9844792
## 3        -0.9877948           -0.9998067        -0.9892371
## 4        -0.9875187           -0.9997702        -0.9832153
## 5        -0.9935909           -0.9998731        -0.9973433
## 6        -0.9948360           -0.9999390        -0.9921667
##   fBodyAccMag-entropy() fBodyAccMag-maxInds fBodyAccMag-meanFreq()
## 1            -0.6463764          -0.7931035            -0.08843612
## 2            -0.8166736          -1.0000000            -0.04414989
## 3            -0.9070143          -0.8620690             0.25789914
## 4            -0.9070143          -1.0000000             0.07358150
## 5            -0.9070143          -1.0000000             0.39431033
## 6            -1.0000000          -1.0000000             0.43796212
##   fBodyAccMag-skewness() fBodyAccMag-kurtosis() fBodyBodyAccJerkMag-mean()
## 1             -0.4364710            -0.7968405                 -0.9937257
## 2             -0.1220404            -0.4495219                 -0.9903355
## 3             -0.6187251            -0.8796846                 -0.9892801
## 4             -0.4684223            -0.7564936                 -0.9927689
## 5             -0.1126629            -0.4818052                 -0.9955228
## 6             -0.5946439            -0.8091864                 -0.9947329
##   fBodyBodyAccJerkMag-std() fBodyBodyAccJerkMag-mad() fBodyBodyAccJerkMag-max()
## 1                -0.9937550                -0.9919757                -0.9933647
## 2                -0.9919603                -0.9897320                -0.9944888
## 3                -0.9908667                -0.9872743                -0.9931788
## 4                -0.9916998                -0.9890549                -0.9944546
## 5                -0.9943890                -0.9933055                -0.9954847
## 6                -0.9951562                -0.9942986                -0.9944851
##   fBodyBodyAccJerkMag-min() fBodyBodyAccJerkMag-sma()
## 1                -0.9881754                -0.9937257
## 2                -0.9895488                -0.9903355
## 3                -0.9998898                -0.9892801
## 4                -0.9955624                -0.9927689
## 5                -0.9821772                -0.9955228
## 6                -0.9830483                -0.9947329
##   fBodyBodyAccJerkMag-energy() fBodyBodyAccJerkMag-iqr()
## 1                 -0.9999184                -0.9913637
## 2                 -0.9998669                -0.9911339
## 3                 -0.9998455                -0.9866576
## 4                 -0.9998948                -0.9880552
## 5                 -0.9999409                -0.9941695
## 6                 -0.9999370                -0.9966966
##   fBodyBodyAccJerkMag-entropy() fBodyBodyAccJerkMag-maxInds
## 1                            -1                 -0.9365079
```

```
## 2                           -1                 -0.8412698
## 3                           -1                 -0.9047619
## 4                           -1                  1.0000000
## 5                           -1                 -1.0000000
## 6                           -1                 -1.0000000
##   fBodyBodyAccJerkMag-meanFreq() fBodyBodyAccJerkMag-skewness()
## 1                      0.3469885                     -0.5160801
## 2                      0.5320605                     -0.6248710
## 3                      0.6607950                     -0.7246967
## 4                      0.6789213                     -0.7011307
## 5                      0.5590577                     -0.5289013
## 6                      0.2469096                     -0.5208793
##   fBodyBodyAccJerkMag-kurtosis() fBodyBodyGyroMag-mean() fBodyBodyGyroMag-std()
## 1                     -0.8027600              -0.9801349             -0.9613094
## 2                     -0.9001600              -0.9882956             -0.9833219
## 3                     -0.9285394              -0.9892548             -0.9860277
## 4                     -0.9096391              -0.9894128             -0.9878358
## 5                     -0.8589325              -0.9914330             -0.9890594
## 6                     -0.8025254              -0.9905000             -0.9858609
##   fBodyBodyGyroMag-mad() fBodyBodyGyroMag-max() fBodyBodyGyroMag-min()
## 1             -0.9736534             -0.9522638             -0.9894981
## 2             -0.9826593             -0.9863208             -0.9918288
## 3             -0.9842736             -0.9909794             -0.9957030
## 4             -0.9868499             -0.9867488             -0.9961994
## 5             -0.9877436             -0.9914617             -0.9983532
## 6             -0.9855120             -0.9882041             -0.9947578
##   fBodyBodyGyroMag-sma() fBodyBodyGyroMag-energy() fBodyBodyGyroMag-iqr()
## 1             -0.9801349                -0.9992403             -0.9926555
## 2             -0.9882956                -0.9998112             -0.9939785
## 3             -0.9892548                -0.9998539             -0.9932383
## 4             -0.9894128                -0.9998756             -0.9891355
## 5             -0.9914330                -0.9999018             -0.9893211
## 6             -0.9905000                -0.9998606             -0.9919667
##   fBodyBodyGyroMag-entropy() fBodyBodyGyroMag-maxInds
## 1                 -0.7012914               -1.0000000
## 2                 -0.7206830               -0.9487180
## 3                 -0.7365215               -0.7948718
## 4                 -0.7208908               -1.0000000
## 5                 -0.7633722               -0.8974359
## 6                 -0.7685767               -1.0000000
##   fBodyBodyGyroMag-meanFreq() fBodyBodyGyroMag-skewness()
## 1                  -0.1289889                   0.5861564
## 2                  -0.2719585                  -0.3363104
## 3                  -0.2127279                  -0.5353521
## 4                  -0.0356842                  -0.2300909
## 5                  -0.2735820                  -0.5102819
## 6                  -0.2973291                  -0.3460445
##   fBodyBodyGyroMag-kurtosis() fBodyBodyGyroJerkMag-mean()
## 1                   0.3746046                  -0.9919904
## 2                  -0.7200151                  -0.9958539
## 3                  -0.8719141                  -0.9950305
## 4                  -0.5112170                  -0.9952207
## 5                  -0.8307018                  -0.9950928
## 6                  -0.7272705                  -0.9951433
```

```
##   fBodyBodyGyroJerkMag-std() fBodyBodyGyroJerkMag-mad()
## 1                 -0.9906975                 -0.9899408
## 2                 -0.9963995                 -0.9954421
## 3                 -0.9951274                 -0.9946396
## 4                 -0.9952369                 -0.9957222
## 5                 -0.9954648                 -0.9952787
## 6                 -0.9952387                 -0.9943979
##   fBodyBodyGyroJerkMag-max() fBodyBodyGyroJerkMag-min()
## 1                 -0.9924478                 -0.9910477
## 2                 -0.9968660                 -0.9944397
## 3                 -0.9960596                 -0.9958663
## 4                 -0.9952731                 -0.9957318
## 5                 -0.9956093                 -0.9974180
## 6                 -0.9960880                 -0.9985194
##   fBodyBodyGyroJerkMag-sma() fBodyBodyGyroJerkMag-energy()
## 1                 -0.9919904                    -0.9999368
## 2                 -0.9958539                    -0.9999807
## 3                 -0.9950305                    -0.9999731
## 4                 -0.9952207                    -0.9999744
## 5                 -0.9950928                    -0.9999745
## 6                 -0.9951433                    -0.9999740
##   fBodyBodyGyroJerkMag-iqr() fBodyBodyGyroJerkMag-entropy()
## 1                 -0.9904579                     -0.8713058
## 2                 -0.9945437                     -1.0000000
## 3                 -0.9937553                     -1.0000000
## 4                 -0.9952260                     -0.9556959
## 5                 -0.9954868                     -1.0000000
## 6                 -0.9945305                     -1.0000000
##   fBodyBodyGyroJerkMag-maxInds fBodyBodyGyroJerkMag-meanFreq()
## 1                   -1.0000000                     -0.07432303
## 2                   -1.0000000                      0.15807454
## 3                   -0.5555556                      0.41450281
## 4                   -0.9365079                      0.40457253
## 5                   -0.9365079                      0.08775301
## 6                   -1.0000000                      0.01995331
##   fBodyBodyGyroJerkMag-skewness() fBodyBodyGyroJerkMag-kurtosis()
## 1                      -0.2986764                      -0.7103041
## 2                      -0.5950509                      -0.8614993
## 3                      -0.3907482                      -0.7601037
## 4                      -0.1172902                      -0.4828445
## 5                      -0.3514709                      -0.6992052
## 6                      -0.5454101                      -0.8446193
##   angle(tBodyAccMean,gravity) angle(tBodyAccJerkMean),gravityMean)
## 1                -0.11275434                           0.030400372
## 2                 0.05347695                          -0.007434566
## 3                -0.11855926                           0.177899480
## 4                -0.03678797                          -0.012892494
## 5                 0.12332005                           0.122541960
## 6                 0.08263215                          -0.143439010
##   angle(tBodyGyroMean,gravityMean) angle(tBodyGyroJerkMean,gravityMean)
## 1                       -0.4647614                           -0.01844588
## 2                       -0.7326262                            0.70351059
## 3                        0.1006992                            0.80852908
## 4                        0.6400110                           -0.48536645
```

```
## 5                       0.6935783                       -0.61597061
## 6                       0.2750408                       -0.36822404
##   angle(X,gravityMean) angle(Y,gravityMean) angle(Z,gravityMean) subject
## 1           -0.8412468           0.1799406          -0.05862692       1
## 2           -0.8447876           0.1802889          -0.05431672       1
## 3           -0.8489335           0.1806373          -0.04911782       1
## 4           -0.8486494           0.1819348          -0.04766318       1
## 5           -0.8478653           0.1851512          -0.04389225       1
## 6           -0.8496316           0.1848225          -0.04212638       1
##   activity
## 1 standing
## 2 standing
## 3 standing
## 4 standing
## 5 standing
## 6 standing
```

```
names(samsungData)[seq(1,ncol(samsungData),by = 3)]
```

```
##   [1] "tBodyAcc-mean()-X"
##   [2] "tBodyAcc-std()-X"
##   [3] "tBodyAcc-mad()-X"
##   [4] "tBodyAcc-max()-X"
##   [5] "tBodyAcc-min()-X"
##   [6] "tBodyAcc-sma()"
##   [7] "tBodyAcc-energy()-Z"
##   [8] "tBodyAcc-iqr()-Z"
##   [9] "tBodyAcc-entropy()-Z"
##  [10] "tBodyAcc-arCoeff()-X,3"
##  [11] "tBodyAcc-arCoeff()-Y,2"
##  [12] "tBodyAcc-arCoeff()-Z,1"
##  [13] "tBodyAcc-arCoeff()-Z,4"
##  [14] "tBodyAcc-correlation()-Y,Z"
##  [15] "tGravityAcc-mean()-Z"
##  [16] "tGravityAcc-std()-Z"
##  [17] "tGravityAcc-mad()-Z"
##  [18] "tGravityAcc-max()-Z"
##  [19] "tGravityAcc-min()-Z"
##  [20] "tGravityAcc-energy()-Y"
##  [21] "tGravityAcc-iqr()-Y"
##  [22] "tGravityAcc-entropy()-Y"
##  [23] "tGravityAcc-arCoeff()-X,2"
##  [24] "tGravityAcc-arCoeff()-Y,1"
##  [25] "tGravityAcc-arCoeff()-Y,4"
##  [26] "tGravityAcc-arCoeff()-Z,3"
##  [27] "tGravityAcc-correlation()-X,Z"
##  [28] "tBodyAccJerk-mean()-Y"
##  [29] "tBodyAccJerk-std()-Y"
##  [30] "tBodyAccJerk-mad()-Y"
##  [31] "tBodyAccJerk-max()-Y"
##  [32] "tBodyAccJerk-min()-Y"
##  [33] "tBodyAccJerk-energy()-X"
##  [34] "tBodyAccJerk-iqr()-X"
##  [35] "tBodyAccJerk-entropy()-X"
```

```
##  [36] "tBodyAccJerk-arCoeff()-X,1"
##  [37] "tBodyAccJerk-arCoeff()-X,4"
##  [38] "tBodyAccJerk-arCoeff()-Y,3"
##  [39] "tBodyAccJerk-arCoeff()-Z,2"
##  [40] "tBodyAccJerk-correlation()-X,Y"
##  [41] "tBodyGyro-mean()-X"
##  [42] "tBodyGyro-std()-X"
##  [43] "tBodyGyro-mad()-X"
##  [44] "tBodyGyro-max()-X"
##  [45] "tBodyGyro-min()-X"
##  [46] "tBodyGyro-sma()"
##  [47] "tBodyGyro-energy()-Z"
##  [48] "tBodyGyro-iqr()-Z"
##  [49] "tBodyGyro-entropy()-Z"
##  [50] "tBodyGyro-arCoeff()-X,3"
##  [51] "tBodyGyro-arCoeff()-Y,2"
##  [52] "tBodyGyro-arCoeff()-Z,1"
##  [53] "tBodyGyro-arCoeff()-Z,4"
##  [54] "tBodyGyro-correlation()-Y,Z"
##  [55] "tBodyGyroJerk-mean()-Z"
##  [56] "tBodyGyroJerk-std()-Z"
##  [57] "tBodyGyroJerk-mad()-Z"
##  [58] "tBodyGyroJerk-max()-Z"
##  [59] "tBodyGyroJerk-min()-Z"
##  [60] "tBodyGyroJerk-energy()-Y"
##  [61] "tBodyGyroJerk-iqr()-Y"
##  [62] "tBodyGyroJerk-entropy()-Y"
##  [63] "tBodyGyroJerk-arCoeff()-X,2"
##  [64] "tBodyGyroJerk-arCoeff()-Y,1"
##  [65] "tBodyGyroJerk-arCoeff()-Y,4"
##  [66] "tBodyGyroJerk-arCoeff()-Z,3"
##  [67] "tBodyGyroJerk-correlation()-X,Z"
##  [68] "tBodyAccMag-std()"
##  [69] "tBodyAccMag-min()"
##  [70] "tBodyAccMag-iqr()"
##  [71] "tBodyAccMag-arCoeff()2"
##  [72] "tGravityAccMag-mean()"
##  [73] "tGravityAccMag-max()"
##  [74] "tGravityAccMag-energy()"
##  [75] "tGravityAccMag-arCoeff()1"
##  [76] "tGravityAccMag-arCoeff()4"
##  [77] "tBodyAccJerkMag-mad()"
##  [78] "tBodyAccJerkMag-sma()"
##  [79] "tBodyAccJerkMag-entropy()"
##  [80] "tBodyAccJerkMag-arCoeff()3"
##  [81] "tBodyGyroMag-std()"
##  [82] "tBodyGyroMag-min()"
##  [83] "tBodyGyroMag-iqr()"
##  [84] "tBodyGyroMag-arCoeff()2"
##  [85] "tBodyGyroJerkMag-mean()"
##  [86] "tBodyGyroJerkMag-max()"
##  [87] "tBodyGyroJerkMag-energy()"
##  [88] "tBodyGyroJerkMag-arCoeff()1"
##  [89] "tBodyGyroJerkMag-arCoeff()4"
```

```
##  [90] "fBodyAcc-mean()-Z"
##  [91] "fBodyAcc-std()-Z"
##  [92] "fBodyAcc-mad()-Z"
##  [93] "fBodyAcc-max()-Z"
##  [94] "fBodyAcc-min()-Z"
##  [95] "fBodyAcc-energy()-Y"
##  [96] "fBodyAcc-iqr()-Y"
##  [97] "fBodyAcc-entropy()-Y"
##  [98] "fBodyAcc-maxInds-Y"
##  [99] "fBodyAcc-meanFreq()-Y"
## [100] "fBodyAcc-kurtosis()-X"
## [101] "fBodyAcc-skewness()-Z"
## [102] "fBodyAcc-bandsEnergy()-9,16"
## [103] "fBodyAcc-bandsEnergy()-33,40"
## [104] "fBodyAcc-bandsEnergy()-57,64"
## [105] "fBodyAcc-bandsEnergy()-33,48"
## [106] "fBodyAcc-bandsEnergy()-25,48"
## [107] "fBodyAcc-bandsEnergy()-17,24"
## [108] "fBodyAcc-bandsEnergy()-41,48"
## [109] "fBodyAcc-bandsEnergy()-1,16"
## [110] "fBodyAcc-bandsEnergy()-49,64"
## [111] "fBodyAcc-bandsEnergy()-1,8"
## [112] "fBodyAcc-bandsEnergy()-25,32"
## [113] "fBodyAcc-bandsEnergy()-49,56"
## [114] "fBodyAcc-bandsEnergy()-17,32"
## [115] "fBodyAcc-bandsEnergy()-1,24"
## [116] "fBodyAccJerk-mean()-Y"
## [117] "fBodyAccJerk-std()-Y"
## [118] "fBodyAccJerk-mad()-Y"
## [119] "fBodyAccJerk-max()-Y"
## [120] "fBodyAccJerk-min()-Y"
## [121] "fBodyAccJerk-energy()-X"
## [122] "fBodyAccJerk-iqr()-X"
## [123] "fBodyAccJerk-entropy()-X"
## [124] "fBodyAccJerk-maxInds-X"
## [125] "fBodyAccJerk-meanFreq()-X"
## [126] "fBodyAccJerk-skewness()-X"
## [127] "fBodyAccJerk-kurtosis()-Y"
## [128] "fBodyAccJerk-bandsEnergy()-1,8"
## [129] "fBodyAccJerk-bandsEnergy()-25,32"
## [130] "fBodyAccJerk-bandsEnergy()-49,56"
## [131] "fBodyAccJerk-bandsEnergy()-17,32"
## [132] "fBodyAccJerk-bandsEnergy()-1,24"
## [133] "fBodyAccJerk-bandsEnergy()-9,16"
## [134] "fBodyAccJerk-bandsEnergy()-33,40"
## [135] "fBodyAccJerk-bandsEnergy()-57,64"
## [136] "fBodyAccJerk-bandsEnergy()-33,48"
## [137] "fBodyAccJerk-bandsEnergy()-25,48"
## [138] "fBodyAccJerk-bandsEnergy()-17,24"
## [139] "fBodyAccJerk-bandsEnergy()-41,48"
## [140] "fBodyAccJerk-bandsEnergy()-1,16"
## [141] "fBodyAccJerk-bandsEnergy()-49,64"
## [142] "fBodyGyro-mean()-X"
## [143] "fBodyGyro-std()-X"
```

```
## [144] "fBodyGyro-mad()-X"
## [145] "fBodyGyro-max()-X"
## [146] "fBodyGyro-min()-X"
## [147] "fBodyGyro-sma()"
## [148] "fBodyGyro-energy()-Z"
## [149] "fBodyGyro-iqr()-Z"
## [150] "fBodyGyro-entropy()-Z"
## [151] "fBodyGyro-maxInds-Z"
## [152] "fBodyGyro-meanFreq()-Z"
## [153] "fBodyGyro-skewness()-Y"
## [154] "fBodyGyro-kurtosis()-Z"
## [155] "fBodyGyro-bandsEnergy()-17,24"
## [156] "fBodyGyro-bandsEnergy()-41,48"
## [157] "fBodyGyro-bandsEnergy()-1,16"
## [158] "fBodyGyro-bandsEnergy()-49,64"
## [159] "fBodyGyro-bandsEnergy()-1,8"
## [160] "fBodyGyro-bandsEnergy()-25,32"
## [161] "fBodyGyro-bandsEnergy()-49,56"
## [162] "fBodyGyro-bandsEnergy()-17,32"
## [163] "fBodyGyro-bandsEnergy()-1,24"
## [164] "fBodyGyro-bandsEnergy()-9,16"
## [165] "fBodyGyro-bandsEnergy()-33,40"
## [166] "fBodyGyro-bandsEnergy()-57,64"
## [167] "fBodyGyro-bandsEnergy()-33,48"
## [168] "fBodyGyro-bandsEnergy()-25,48"
## [169] "fBodyAccMag-mad()"
## [170] "fBodyAccMag-sma()"
## [171] "fBodyAccMag-entropy()"
## [172] "fBodyAccMag-skewness()"
## [173] "fBodyBodyAccJerkMag-std()"
## [174] "fBodyBodyAccJerkMag-min()"
## [175] "fBodyBodyAccJerkMag-iqr()"
## [176] "fBodyBodyAccJerkMag-meanFreq()"
## [177] "fBodyBodyGyroMag-mean()"
## [178] "fBodyBodyGyroMag-max()"
## [179] "fBodyBodyGyroMag-energy()"
## [180] "fBodyBodyGyroMag-maxInds"
## [181] "fBodyBodyGyroMag-kurtosis()"
## [182] "fBodyBodyGyroJerkMag-mad()"
## [183] "fBodyBodyGyroJerkMag-sma()"
## [184] "fBodyBodyGyroJerkMag-entropy()"
## [185] "fBodyBodyGyroJerkMag-skewness()"
## [186] "angle(tBodyAccJerkMean),gravityMean)"
## [187] "angle(X,gravityMean)"
## [188] "subject"
```

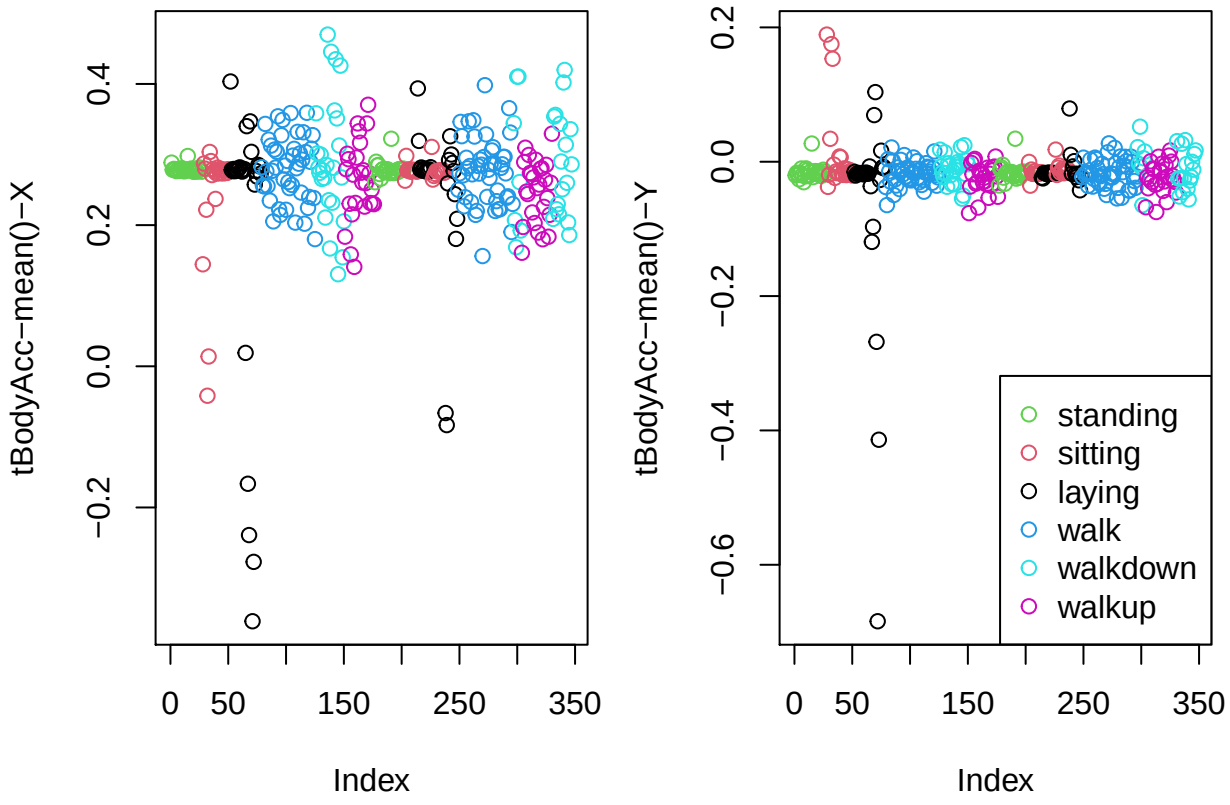
Clean variable names

```
data <- samsungData
variableNames = c(names(samsungData))
cleanVariableNames <- c(paste0("v",c(1:561)),"subject","activity")
names(data) <- cleanVariableNames
```

Exploratory Analysis

Plotting average acceleration for first subject

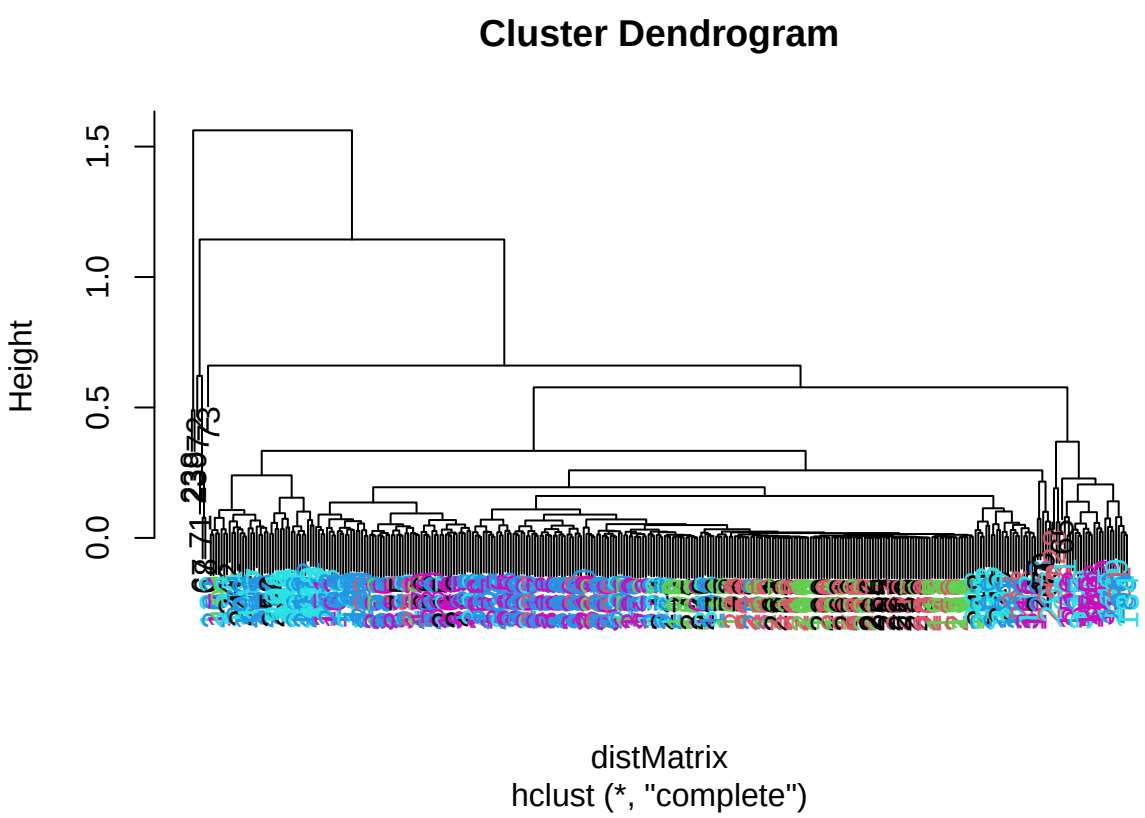
```
par(mfrow=c(1,2),mar = c(5,4,1,1))
# Change Activity variable to factor
data = transform(data, activity = factor(activity))
sub1 = subset(data, subject == 1)
plot(sub1[,1],col = sub1$activity, ylab=variableNames[1])
plot(sub1[,2],col = sub1$activity, ylab=variableNames[2])
legend("bottomright", legend=unique(sub1$activity),col = unique(sub1$activity),pch =1)
```



Clustering the data on average acceleration

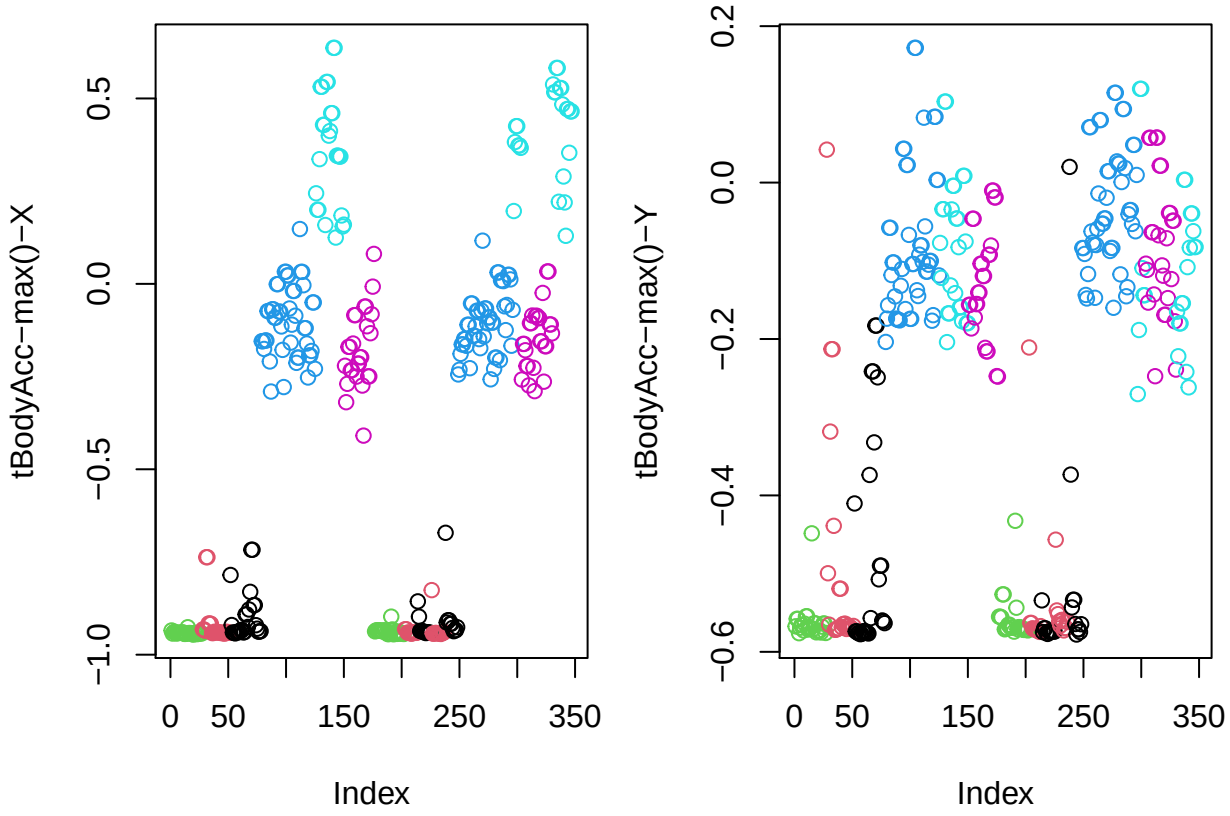
Average acceleration data is stored in the first 3 columns/variables v1-v3

```
source("myplclust.R")
distMatrix = dist(sub1[,1:3])
hclustering = hclust(distMatrix)
myplclust(hclustering, lab.col = c(unclass(sub1$activity)))
```



Plotting max acceleration for first subject

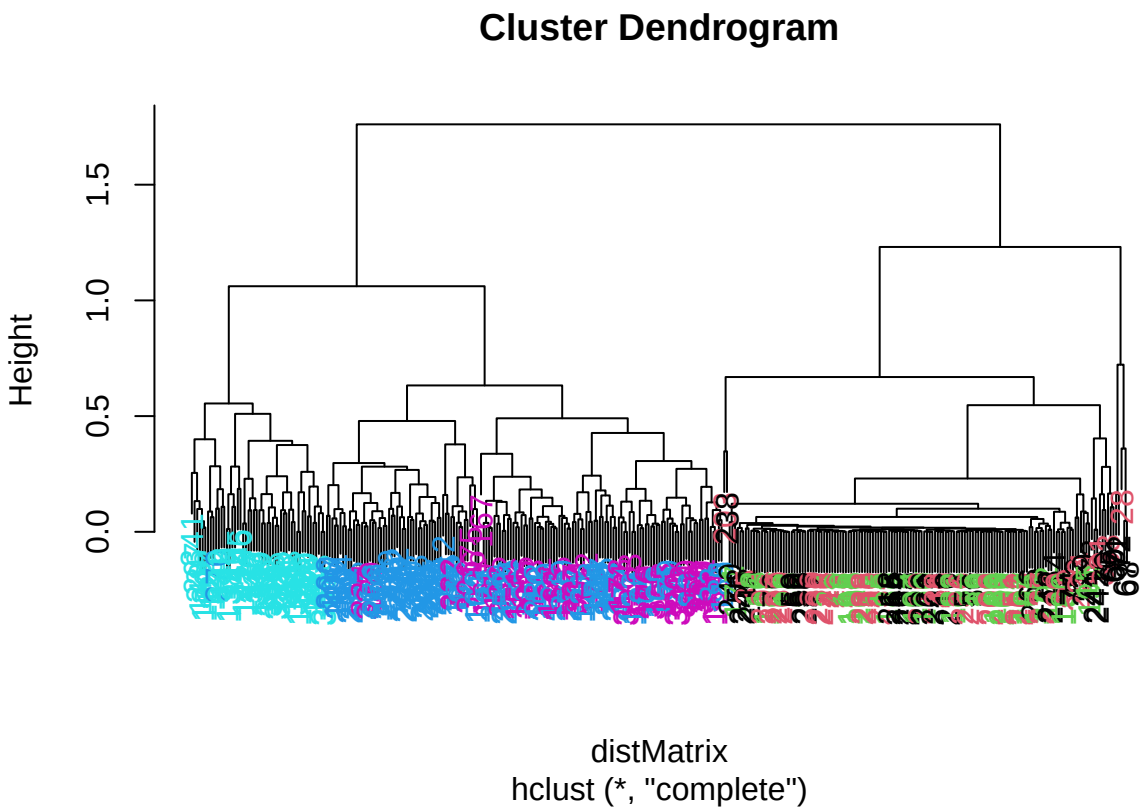
```
par(mfrow=c(1,2),mar = c(5,4,1,1))
plot(sub1[,10],col = sub1$activity, ylab=variableNames[10])
plot(sub1[,11],col = sub1$activity, ylab=variableNames[11])
```



Clustering the data on max acceleration

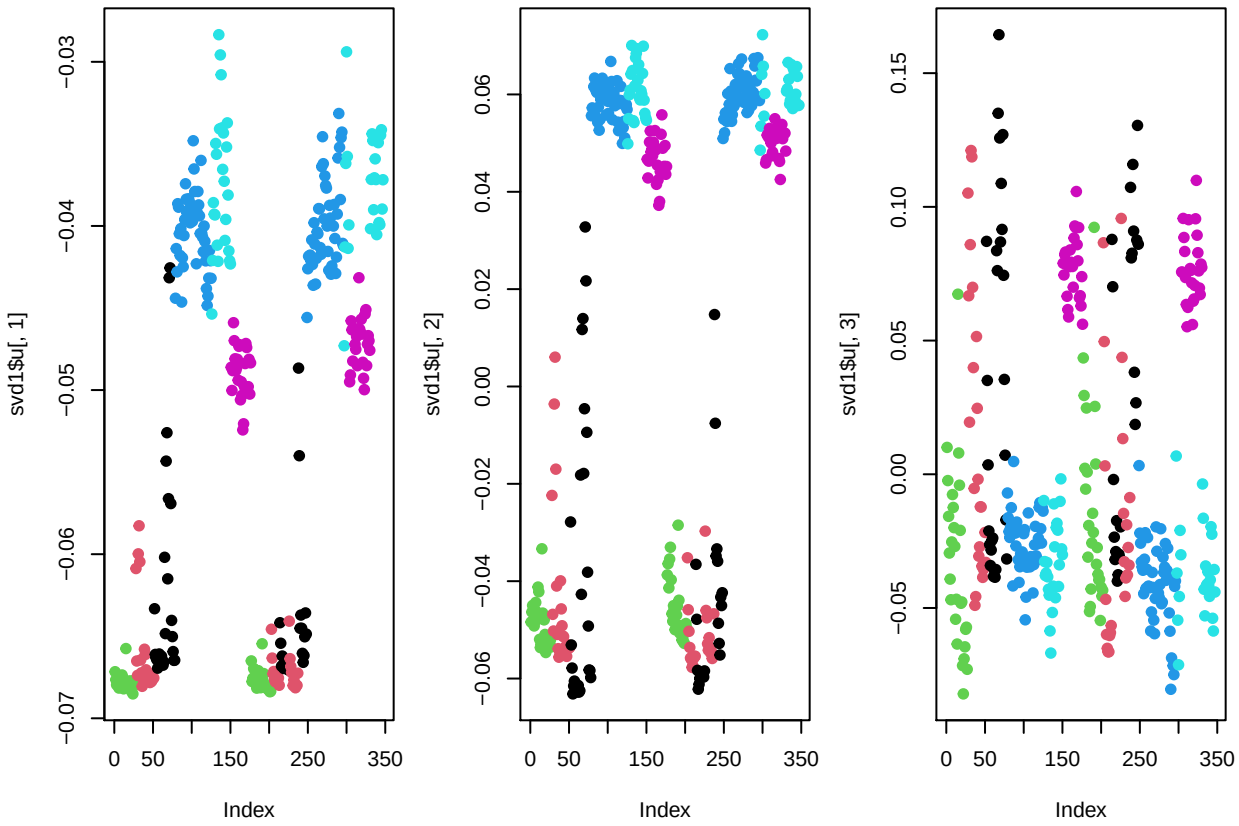
Average acceleration data is stored in the first 3 columns/variables v1-v3

```
source("myplclust.R")
distMatrix = dist(sub1[,10:12])
hclustering = hclust(distMatrix)
myplclust(hclustering, lab.col = c(unclass(sub1$activity)))
```



Performing Singular Value Decomposition

```
svd1 = svd(sub1[,-c(562,563)])
par(mfrow=c(1,3),mar = c(5,4,1,1))
plot(svd1$u[,1], col = sub1$activity, pch =19)
plot(svd1$u[,2], col = sub1$activity, pch =19)
plot(svd1$u[,3], col = sub1$activity, pch =19)
```

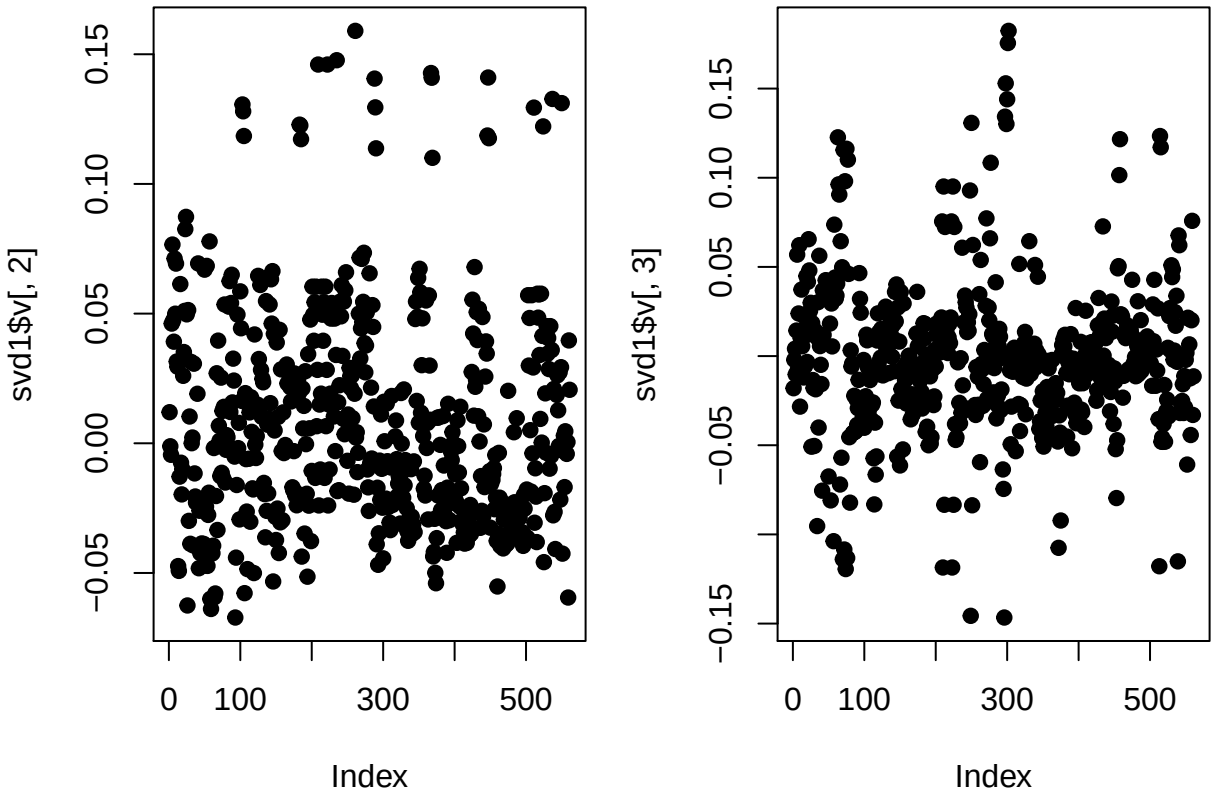


In the first left singular vector the moving activities have been separated from the stationary activities,the second singular vector doesn't seem to be all that different from the first but is definitely much better than the first left singular vector to separate the moving category from the stationary, whereas in the third singular vector we observe that the magenta color-coded activity distinguishly separated from the rest of theactivity.

Therefore we examine the Second third singular vector to find out the variable which contributes most to this peculiar behaviour.

Inorder to do so we examine the corresponding right singular vector - the second and third right singular vectors

```
par(mfrow=c(1,2),mar = c(5,4,1,1))
plot(svd1$v[,2],pch=19)
plot(svd1$v[,3],pch=19)
```



We use the which.max function to locate the index which has maximum value for the singular vectors 2 and 3 respectively.

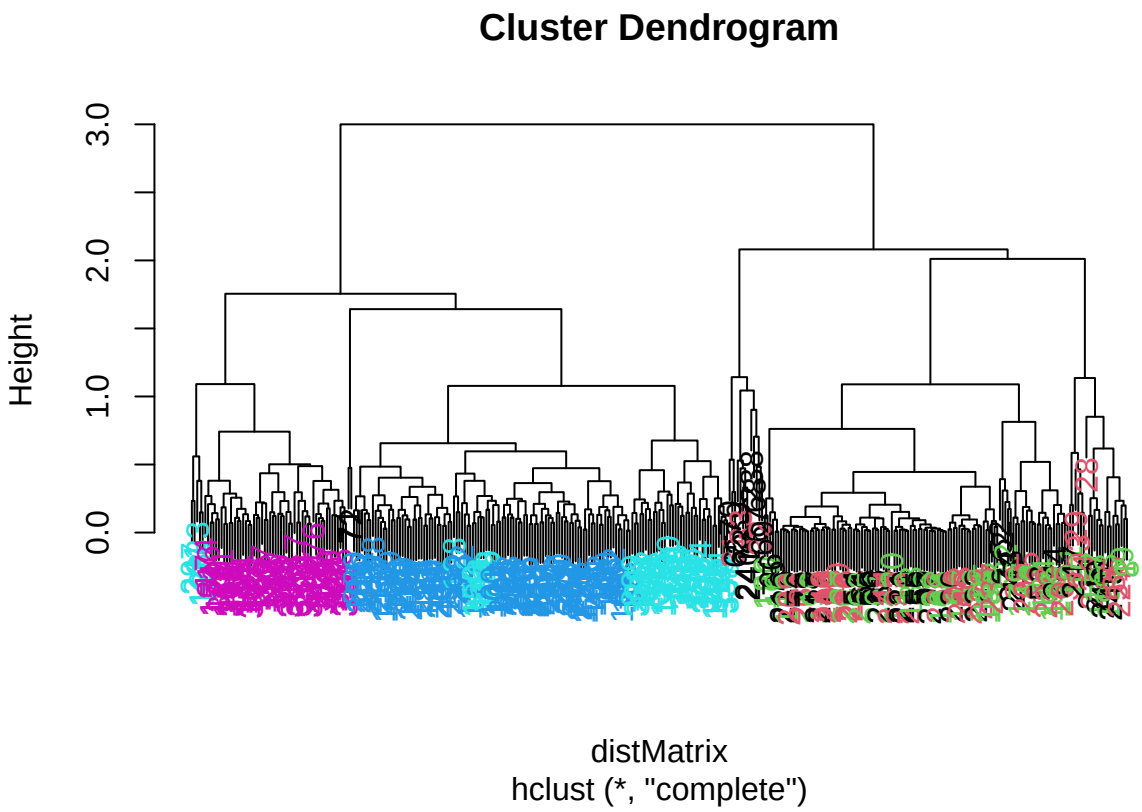
```
maxCon = c(which.max(svd1$v[,2]),which.max(svd1$v[,3]))
variableNames[maxCon]
```

```
## [1] "tBodyGyroJerkMag-entropy()" "fBodyAcc-kurtosis()-Z"
```

Upon inspection the variable in question are the "tBodyGyroJerkMag-entropy()" that influences the second singular vector the most, and "fBodyAcc-kurtosis()-Z" for the third similarly.

And now, we can use these values along with the original 3 max acceleration variables to cluster the data

```
distMatrix = dist(sub1[,c(10:12,maxCon)])
hclustering = hclust(distMatrix)
myplclust(hclustering, lab.col = c(unclass(sub1$activity)))
```



Compared to the initial clustering, Within the moving category there is better separation between the sub-categories, albiet just within the moving category, we need to perform further analysis to find the variable that can be used to separate the sub-category of activities within the stationary category.

Employing K-Means clustering to cluster the data into the various activies.

First try basis clustering

```
kClust = kmeans(sub1[,-c(562,563)],centers = 6, nstart = 250)
table(kClust$cluster,sub1$activity)
```

```
##
##      laying sitting standing walk walkdown walkup
##    1      3       0        0    0        0     53
##    2      0      37       51    0        0      0
##    3     18      10        2    0        0      0
##    4     29       0        0    0        0      0
##    5      0       0        0    0       49      0
##    6      0       0        0   95        0      0
```

Deleting unecessary folder

```r
unlink("./samsungData.rda")
```