Getting and Cleaning Data

```r
# importing libraries
library(data.table)
library(reshape2)
```

importing the libraries

```
##
## Attaching package: 'reshape2'

## The following objects are masked from 'package:data.table':
##
##     dcast, melt
```

```r
cur_path = getwd()
```

get the working directory

```r
# get activity labels + features
activity_labels <- fread(file.path(cur_path, "UCI HAR Dataset/activity_labels.txt"), col.names = c("cla
activity_labels
```

get the activity labels

```
##    class_labels      activity_names
## 1:            1             WALKING
## 2:            2    WALKING_UPSTAIRS
## 3:            3  WALKING_DOWNSTAIRS
## 4:            4             SITTING
## 5:            5            STANDING
## 6:            6              LAYING
```

```r
features <- fread(file.path(cur_path, "UCI HAR Dataset/features.txt"), col.names = c("index", "feature_
features
```

get the features

```
##      index                  feature_names
##   1:     1                tBodyAcc-mean()-X
##   2:     2                tBodyAcc-mean()-Y
##   3:     3                tBodyAcc-mean()-Z
##   4:     4                 tBodyAcc-std()-X
##   5:     5                 tBodyAcc-std()-Y
##  ---
## 557:   557     angle(tBodyGyroMean,gravityMean)
## 558:   558 angle(tBodyGyroJerkMean,gravityMean)
```

```
## 559:    559                angle(X,gravityMean)
## 560:    560                angle(Y,gravityMean)
## 561:    561                angle(Z,gravityMean)
```

```r
interested_features <- grep("(mean|std)\\(\\)", features[, feature_names])
interested_features
```

get the index of interested features

```
##  [1]   1   2   3   4   5   6  41  42  43  44  45  46  81  82  83  84  85  86 121
## [20] 122 123 124 125 126 161 162 163 164 165 166 201 202 214 215 227 228 240 241
## [39] 253 254 266 267 268 269 270 271 345 346 347 348 349 350 424 425 426 427 428
## [58] 429 503 504 516 517 529 530 542 543
```

```r
measurements <- features[interested_features, feature_names]
measurements <- gsub('[()]', '', measurements)
measurements
```

grab the features and remove the brackets

```
##  [1] "tBodyAcc-mean-X"         "tBodyAcc-mean-Y"
##  [3] "tBodyAcc-mean-Z"         "tBodyAcc-std-X"
##  [5] "tBodyAcc-std-Y"          "tBodyAcc-std-Z"
##  [7] "tGravityAcc-mean-X"      "tGravityAcc-mean-Y"
##  [9] "tGravityAcc-mean-Z"      "tGravityAcc-std-X"
## [11] "tGravityAcc-std-Y"       "tGravityAcc-std-Z"
## [13] "tBodyAccJerk-mean-X"     "tBodyAccJerk-mean-Y"
## [15] "tBodyAccJerk-mean-Z"     "tBodyAccJerk-std-X"
## [17] "tBodyAccJerk-std-Y"      "tBodyAccJerk-std-Z"
## [19] "tBodyGyro-mean-X"        "tBodyGyro-mean-Y"
## [21] "tBodyGyro-mean-Z"        "tBodyGyro-std-X"
## [23] "tBodyGyro-std-Y"         "tBodyGyro-std-Z"
## [25] "tBodyGyroJerk-mean-X"    "tBodyGyroJerk-mean-Y"
## [27] "tBodyGyroJerk-mean-Z"    "tBodyGyroJerk-std-X"
## [29] "tBodyGyroJerk-std-Y"     "tBodyGyroJerk-std-Z"
## [31] "tBodyAccMag-mean"        "tBodyAccMag-std"
## [33] "tGravityAccMag-mean"     "tGravityAccMag-std"
## [35] "tBodyAccJerkMag-mean"    "tBodyAccJerkMag-std"
## [37] "tBodyGyroMag-mean"       "tBodyGyroMag-std"
## [39] "tBodyGyroJerkMag-mean"   "tBodyGyroJerkMag-std"
## [41] "fBodyAcc-mean-X"         "fBodyAcc-mean-Y"
## [43] "fBodyAcc-mean-Z"         "fBodyAcc-std-X"
## [45] "fBodyAcc-std-Y"          "fBodyAcc-std-Z"
## [47] "fBodyAccJerk-mean-X"     "fBodyAccJerk-mean-Y"
## [49] "fBodyAccJerk-mean-Z"     "fBodyAccJerk-std-X"
## [51] "fBodyAccJerk-std-Y"      "fBodyAccJerk-std-Z"
## [53] "fBodyGyro-mean-X"        "fBodyGyro-mean-Y"
## [55] "fBodyGyro-mean-Z"        "fBodyGyro-std-X"
## [57] "fBodyGyro-std-Y"         "fBodyGyro-std-Z"
## [59] "fBodyAccMag-mean"        "fBodyAccMag-std"
## [61] "fBodyBodyAccJerkMag-mean" "fBodyBodyAccJerkMag-std"
## [63] "fBodyBodyGyroMag-mean"    "fBodyBodyGyroMag-std"
## [65] "fBodyBodyGyroJerkMag-mean" "fBodyBodyGyroJerkMag-std"
```

```r
x_train <- fread(file.path(cur_path, "UCI HAR Dataset/train/X_train.txt"))
x_train_interested <- x_train[, interested_features, with = FALSE]
head(x_train_interested)
```

get the training data and chose only interested features

```
##          V1          V2         V3         V4         V5         V6        V41
## 1: 0.2885845 -0.02029417 -0.1329051 -0.9952786 -0.9831106 -0.9135264 0.9633961
## 2: 0.2784188 -0.01641057 -0.1235202 -0.9982453 -0.9753002 -0.9603220 0.9665611
## 3: 0.2796531 -0.01946716 -0.1134617 -0.9953796 -0.9671870 -0.9789440 0.9668781
## 4: 0.2791739 -0.02620065 -0.1232826 -0.9960915 -0.9834027 -0.9906751 0.9676152
## 5: 0.2766288 -0.01656965 -0.1153619 -0.9981386 -0.9808173 -0.9904816 0.9682244
## 6: 0.2771988 -0.01009785 -0.1051373 -0.9973350 -0.9904868 -0.9954200 0.9679482
##          V42        V43        V44        V45        V46        V81
## 1: -0.1408397 0.11537494 -0.9852497 -0.9817084 -0.8776250 0.07799634
## 2: -0.1415513 0.10937881 -0.9974113 -0.9894474 -0.9316387 0.07400671
## 3: -0.1420098 0.10188392 -0.9995740 -0.9928658 -0.9929172 0.07363596
## 4: -0.1439765 0.09985014 -0.9966456 -0.9813928 -0.9784764 0.07732061
## 5: -0.1487502 0.09448590 -0.9984293 -0.9880982 -0.9787449 0.07344436
## 6: -0.1482100 0.09190972 -0.9989793 -0.9867539 -0.9973064 0.07793244
##            V82          V83        V84        V85        V86        V121
## 1: 0.005000803 -0.067830808 -0.9935191 -0.9883600 -0.9935750 -0.006100849
## 2: 0.005771104  0.029376633 -0.9955481 -0.9810636 -0.9918457 -0.016111620
## 3: 0.003104037 -0.009045631 -0.9907428 -0.9809556 -0.9896866 -0.031698294
## 4: 0.020057642 -0.009864772 -0.9926974 -0.9875527 -0.9934976 -0.043409983
## 5: 0.019121574  0.016779979 -0.9964202 -0.9883587 -0.9924549 -0.033960416
## 6: 0.018684046  0.009344434 -0.9948136 -0.9887145 -0.9922663 -0.028775508
##          V122       V123       V124       V125       V126        V161
## 1: -0.03136479 0.10772540 -0.9853103 -0.9766234 -0.9922053 -0.09916740
## 2: -0.08389378 0.10058429 -0.9831200 -0.9890458 -0.9891212 -0.11050283
## 3: -0.10233542 0.09612688 -0.9762921 -0.9935518 -0.9863787 -0.10848567
## 4: -0.09138618 0.08553770 -0.9913848 -0.9924073 -0.9875542 -0.09116989
## 5: -0.07470803 0.07739203 -0.9851836 -0.9923781 -0.9874019 -0.09077010
## 6: -0.07039311 0.07901214 -0.9851808 -0.9921175 -0.9830768 -0.09424758
##          V162        V163       V164       V165       V166        V201
## 1: -0.05551737 -0.06198580 -0.9921107 -0.9925193 -0.9920553 -0.9594339
## 2: -0.04481873 -0.05924282 -0.9898726 -0.9972926 -0.9938510 -0.9792892
## 3: -0.04241031 -0.05582883 -0.9884618 -0.9956321 -0.9915318 -0.9837031
## 4: -0.03633262 -0.06046466 -0.9911194 -0.9966410 -0.9933289 -0.9865418
## 5: -0.03763253 -0.05828932 -0.9913545 -0.9964730 -0.9945110 -0.9928271
## 6: -0.04335526 -0.04193600 -0.9916216 -0.9960147 -0.9930906 -0.9942950
##          V202       V214       V215       V227       V228       V240       V241
## 1: -0.9505515 -0.9594339 -0.9505515 -0.9933059 -0.9943364 -0.9689591 -0.9643352
## 2: -0.9760571 -0.9792892 -0.9760571 -0.9912535 -0.9916944 -0.9806831 -0.9837542
## 3: -0.9880196 -0.9837031 -0.9880196 -0.9885313 -0.9903969 -0.9763171 -0.9860515
## 4: -0.9864213 -0.9865418 -0.9864213 -0.9930780 -0.9933808 -0.9820599 -0.9873511
## 5: -0.9912754 -0.9928271 -0.9912754 -0.9934800 -0.9958537 -0.9852037 -0.9890626
## 6: -0.9952490 -0.9942950 -0.9952490 -0.9930177 -0.9954243 -0.9858944 -0.9864403
##          V253       V254       V266       V267       V268       V269       V270
## 1: -0.9942478 -0.9913676 -0.9947832 -0.9829841 -0.9392687 -0.9954217 -0.9831330
## 2: -0.9951232 -0.9961016 -0.9974507 -0.9768517 -0.9735227 -0.9986803 -0.9749298
## 3: -0.9934032 -0.9950910 -0.9935941 -0.9725115 -0.9833040 -0.9963128 -0.9655059
## 4: -0.9955022 -0.9952666 -0.9954906 -0.9835697 -0.9910798 -0.9963121 -0.9832444
```

```
## 5: -0.9958076 -0.9952580 -0.9972859 -0.9823010 -0.9883694 -0.9986065 -0.9801295
## 6: -0.9952748 -0.9952050 -0.9966567 -0.9869395 -0.9927386 -0.9976438 -0.9922637
##          V271       V345       V346       V347       V348       V349       V350
## 1: -0.9061650 -0.9923325 -0.9871699 -0.9896961 -0.9958207 -0.9909363 -0.9970517
## 2: -0.9554381 -0.9950322 -0.9813115 -0.9897398 -0.9966523 -0.9820839 -0.9926268
## 3: -0.9770493 -0.9909937 -0.9816423 -0.9875663 -0.9912488 -0.9814148 -0.9904159
## 4: -0.9902291 -0.9944466 -0.9887272 -0.9913542 -0.9913783 -0.9869269 -0.9943908
## 5: -0.9919150 -0.9962920 -0.9887900 -0.9906244 -0.9969025 -0.9886067 -0.9929065
## 6: -0.9970459 -0.9948507 -0.9882443 -0.9901575 -0.9952180 -0.9901788 -0.9930667
##          V424       V425       V426       V427       V428       V429       V503
## 1: -0.9865744 -0.9817615 -0.9895148 -0.9850326 -0.9738861 -0.9940349 -0.9521547
## 2: -0.9773867 -0.9925300 -0.9896058 -0.9849043 -0.9871681 -0.9897847 -0.9808566
## 3: -0.9754332 -0.9937147 -0.9867557 -0.9766422 -0.9933990 -0.9873282 -0.9877948
## 4: -0.9871096 -0.9936015 -0.9871913 -0.9928104 -0.9916460 -0.9886776 -0.9875187
## 5: -0.9824465 -0.9929838 -0.9886664 -0.9859818 -0.9919558 -0.9879443 -0.9935909
## 6: -0.9848902 -0.9927862 -0.9807784 -0.9852871 -0.9916595 -0.9853661 -0.9948360
##          V504       V516       V517       V529       V530       V542       V543
## 1: -0.9561340 -0.9937257 -0.9937550 -0.9801349 -0.9613094 -0.9919904 -0.9906975
## 2: -0.9758658 -0.9903355 -0.9919603 -0.9882956 -0.9833219 -0.9958539 -0.9963995
## 3: -0.9890155 -0.9892801 -0.9908667 -0.9892548 -0.9860277 -0.9950305 -0.9951274
## 4: -0.9867420 -0.9927689 -0.9916998 -0.9894128 -0.9878358 -0.9952207 -0.9952369
## 5: -0.9900635 -0.9955228 -0.9943890 -0.9914330 -0.9890594 -0.9950928 -0.9954648
## 6: -0.9952833 -0.9947329 -0.9951562 -0.9905000 -0.9858609 -0.9951433 -0.9952387
```

```r
setnames(x_train_interested, colnames(x_train_interested), measurements)
head(x_train_interested)
```

set the column names equal to the measurements

```
##     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 tGravityAcc-mean-X tGravityAcc-mean-Y
## 1:     -0.9831106     -0.9135264          0.9633961         -0.1408397
## 2:     -0.9753002     -0.9603220          0.9665611         -0.1415513
## 3:     -0.9671870     -0.9789440          0.9668781         -0.1420098
## 4:     -0.9834027     -0.9906751          0.9676152         -0.1439765
## 5:     -0.9808173     -0.9904816          0.9682244         -0.1487502
## 6:     -0.9904868     -0.9954200          0.9679482         -0.1482100
##     tGravityAcc-mean-Z tGravityAcc-std-X tGravityAcc-std-Y tGravityAcc-std-Z
## 1:         0.11537494        -0.9852497        -0.9817084        -0.8776250
## 2:         0.10937881        -0.9974113        -0.9894474        -0.9316387
## 3:         0.10188392        -0.9995740        -0.9928658        -0.9929172
## 4:         0.09985014        -0.9966456        -0.9813928        -0.9784764
## 5:         0.09448590        -0.9984293        -0.9880982        -0.9787449
## 6:         0.09190972        -0.9989793        -0.9867539        -0.9973064
##     tBodyAccJerk-mean-X tBodyAccJerk-mean-Y tBodyAccJerk-mean-Z
## 1:          0.07799634         0.005000803         -0.067830808
## 2:          0.07400671         0.005771104          0.029376633
## 3:          0.07363596         0.003104037         -0.009045631
```

```
## 4:         0.07732061         0.020057642        -0.009864772
## 5:         0.07344436         0.019121574         0.016779979
## 6:         0.07793244         0.018684046         0.009344434
##    tBodyAccJerk-std-X tBodyAccJerk-std-Y tBodyAccJerk-std-Z tBodyGyro-mean-X
## 1:         -0.9935191         -0.9883600         -0.9935750     -0.006100849
## 2:         -0.9955481         -0.9810636         -0.9918457     -0.016111620
## 3:         -0.9907428         -0.9809556         -0.9896866     -0.031698294
## 4:         -0.9926974         -0.9875527         -0.9934976     -0.043409983
## 5:         -0.9964202         -0.9883587         -0.9924549     -0.033960416
## 6:         -0.9948136         -0.9887145         -0.9922663     -0.028775508
##    tBodyGyro-mean-Y tBodyGyro-mean-Z tBodyGyro-std-X tBodyGyro-std-Y
## 1:      -0.03136479       0.10772540     -0.9853103       -0.9766234
## 2:      -0.08389378       0.10058429     -0.9831200       -0.9890458
## 3:      -0.10233542       0.09612688     -0.9762921       -0.9935518
## 4:      -0.09138618       0.08553770     -0.9913848       -0.9924073
## 5:      -0.07470803       0.07739203     -0.9851836       -0.9923781
## 6:      -0.07039311       0.07901214     -0.9851808       -0.9921175
##    tBodyGyro-std-Z tBodyGyroJerk-mean-X tBodyGyroJerk-mean-Y
## 1:      -0.9922053          -0.09916740          -0.05551737
## 2:      -0.9891212          -0.11050283          -0.04481873
## 3:      -0.9863787          -0.10848567          -0.04241031
## 4:      -0.9875542          -0.09116989          -0.03633262
## 5:      -0.9874019          -0.09077010          -0.03763253
## 6:      -0.9830768          -0.09424758          -0.04335526
##    tBodyGyroJerk-mean-Z tBodyGyroJerk-std-X tBodyGyroJerk-std-Y
## 1:          -0.06198580          -0.9921107          -0.9925193
## 2:          -0.05924282          -0.9898726          -0.9972926
## 3:          -0.05582883          -0.9884618          -0.9956321
## 4:          -0.06046466          -0.9911194          -0.9966410
## 5:          -0.05828932          -0.9913545          -0.9964730
## 6:          -0.04193600          -0.9916216          -0.9960147
##    tBodyGyroJerk-std-Z tBodyAccMag-mean tBodyAccMag-std tGravityAccMag-mean
## 1:          -0.9920553       -0.9594339      -0.9505515          -0.9594339
## 2:          -0.9938510       -0.9792892      -0.9760571          -0.9792892
## 3:          -0.9915318       -0.9837031      -0.9880196          -0.9837031
## 4:          -0.9933289       -0.9865418      -0.9864213          -0.9865418
## 5:          -0.9945110       -0.9928271      -0.9912754          -0.9928271
## 6:          -0.9930906       -0.9942950      -0.9952490          -0.9942950
##    tGravityAccMag-std tBodyAccJerkMag-mean tBodyAccJerkMag-std
## 1:         -0.9505515           -0.9933059          -0.9943364
## 2:         -0.9760571           -0.9912535          -0.9916944
## 3:         -0.9880196           -0.9885313          -0.9903969
## 4:         -0.9864213           -0.9930780          -0.9933808
## 5:         -0.9912754           -0.9934800          -0.9958537
## 6:         -0.9952490           -0.9930177          -0.9954243
##    tBodyGyroMag-mean tBodyGyroMag-std tBodyGyroJerkMag-mean
## 1:        -0.9689591       -0.9643352            -0.9942478
## 2:        -0.9806831       -0.9837542            -0.9951232
## 3:        -0.9763171       -0.9860515            -0.9934032
## 4:        -0.9820599       -0.9873511            -0.9955022
## 5:        -0.9852037       -0.9890626            -0.9958076
## 6:        -0.9858944       -0.9864403            -0.9952748
##    tBodyGyroJerkMag-std fBodyAcc-mean-X fBodyAcc-mean-Y fBodyAcc-mean-Z
## 1:           -0.9913676      -0.9947832      -0.9829841      -0.9392687
```

```
## 2:          -0.9961016      -0.9974507      -0.9768517      -0.9735227
## 3:          -0.9950910      -0.9935941      -0.9725115      -0.9833040
## 4:          -0.9952666      -0.9954906      -0.9835697      -0.9910798
## 5:          -0.9952580      -0.9972859      -0.9823010      -0.9883694
## 6:          -0.9952050      -0.9966567      -0.9869395      -0.9927386
##     fBodyAcc-std-X fBodyAcc-std-Y fBodyAcc-std-Z fBodyAccJerk-mean-X
## 1:     -0.9954217     -0.9831330     -0.9061650         -0.9923325
## 2:     -0.9986803     -0.9749298     -0.9554381         -0.9950322
## 3:     -0.9963128     -0.9655059     -0.9770493         -0.9909937
## 4:     -0.9963121     -0.9832444     -0.9902291         -0.9944466
## 5:     -0.9986065     -0.9801295     -0.9919150         -0.9962920
## 6:     -0.9976438     -0.9922637     -0.9970459         -0.9948507
##     fBodyAccJerk-mean-Y fBodyAccJerk-mean-Z fBodyAccJerk-std-X
## 1:          -0.9871699          -0.9896961         -0.9958207
## 2:          -0.9813115          -0.9897398         -0.9966523
## 3:          -0.9816423          -0.9875663         -0.9912488
## 4:          -0.9887272          -0.9913542         -0.9913783
## 5:          -0.9887900          -0.9906244         -0.9969025
## 6:          -0.9882443          -0.9901575         -0.9952180
##     fBodyAccJerk-std-Y fBodyAccJerk-std-Z fBodyGyro-mean-X fBodyGyro-mean-Y
## 1:          -0.9909363         -0.9970517      -0.9865744       -0.9817615
## 2:          -0.9820839         -0.9926268      -0.9773867       -0.9925300
## 3:          -0.9814148         -0.9904159      -0.9754332       -0.9937147
## 4:          -0.9869269         -0.9943908      -0.9871096       -0.9936015
## 5:          -0.9886067         -0.9929065      -0.9824465       -0.9929838
## 6:          -0.9901788         -0.9930667      -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
##     fBodyAccMag-mean fBodyAccMag-std fBodyBodyAccJerkMag-mean
## 1:       -0.9521547      -0.9561340             -0.9937257
## 2:       -0.9808566      -0.9758658             -0.9903355
## 3:       -0.9877948      -0.9890155             -0.9892801
## 4:       -0.9875187      -0.9867420             -0.9927689
## 5:       -0.9935909      -0.9900635             -0.9955228
## 6:       -0.9948360      -0.9952833             -0.9947329
##     fBodyBodyAccJerkMag-std fBodyBodyGyroMag-mean fBodyBodyGyroMag-std
## 1:              -0.9937550            -0.9801349             -0.9613094
## 2:              -0.9919603            -0.9882956             -0.9833219
## 3:              -0.9908667            -0.9892548             -0.9860277
## 4:              -0.9916998            -0.9894128             -0.9878358
## 5:              -0.9943890            -0.9914330             -0.9890594
## 6:              -0.9951562            -0.9905000             -0.9858609
##     fBodyBodyGyroJerkMag-mean fBodyBodyGyroJerkMag-std
## 1:              -0.9919904             -0.9906975
## 2:              -0.9958539             -0.9963995
## 3:              -0.9950305             -0.9951274
## 4:              -0.9952207             -0.9952369
## 5:              -0.9950928             -0.9954648
## 6:              -0.9951433             -0.9952387
```

```
activities_train <- fread(file.path(cur_path, "UCI HAR Dataset/train/Y_train.txt"), col.names = c("activ
subject_train <- fread(file.path(cur_path, "UCI HAR Dataset/train/subject_train.txt"), col.names = c("su
x_train_interested <- cbind(subject_train, activities_train, x_train_interested)
head(x_train_interested)
```

get activities, subject and bind them along with training data

```
##    subject_num activity tBodyAcc-mean-X tBodyAcc-mean-Y tBodyAcc-mean-Z
## 1:           1        5       0.2885845     -0.02029417      -0.1329051
## 2:           1        5       0.2784188     -0.01641057      -0.1235202
## 3:           1        5       0.2796531     -0.01946716      -0.1134617
## 4:           1        5       0.2791739     -0.02620065      -0.1232826
## 5:           1        5       0.2766288     -0.01656965      -0.1153619
## 6:           1        5       0.2771988     -0.01009785      -0.1051373
##    tBodyAcc-std-X tBodyAcc-std-Y tBodyAcc-std-Z tGravityAcc-mean-X
## 1:     -0.9952786     -0.9831106     -0.9135264          0.9633961
## 2:     -0.9982453     -0.9753002     -0.9603220          0.9665611
## 3:     -0.9953796     -0.9671870     -0.9789440          0.9668781
## 4:     -0.9960915     -0.9834027     -0.9906751          0.9676152
## 5:     -0.9981386     -0.9808173     -0.9904816          0.9682244
## 6:     -0.9973350     -0.9904868     -0.9954200          0.9679482
##    tGravityAcc-mean-Y tGravityAcc-mean-Z tGravityAcc-std-X tGravityAcc-std-Y
## 1:         -0.1408397         0.11537494        -0.9852497        -0.9817084
## 2:         -0.1415513         0.10937881        -0.9974113        -0.9894474
## 3:         -0.1420098         0.10188392        -0.9995740        -0.9928658
## 4:         -0.1439765         0.09985014        -0.9966456        -0.9813928
## 5:         -0.1487502         0.09448590        -0.9984293        -0.9880982
## 6:         -0.1482100         0.09190972        -0.9989793        -0.9867539
##    tGravityAcc-std-Z tBodyAccJerk-mean-X tBodyAccJerk-mean-Y
## 1:        -0.8776250          0.07799634         0.005000803
## 2:        -0.9316387          0.07400671         0.005771104
## 3:        -0.9929172          0.07363596         0.003104037
## 4:        -0.9784764          0.07732061         0.020057642
## 5:        -0.9787449          0.07344436         0.019121574
## 6:        -0.9973064          0.07793244         0.018684046
##    tBodyAccJerk-mean-Z tBodyAccJerk-std-X tBodyAccJerk-std-Y tBodyAccJerk-std-Z
## 1:        -0.067830808         -0.9935191         -0.9883600         -0.9935750
## 2:         0.029376633         -0.9955481         -0.9810636         -0.9918457
## 3:        -0.009045631         -0.9907428         -0.9809556         -0.9896866
## 4:        -0.009864772         -0.9926974         -0.9875527         -0.9934976
## 5:         0.016779979         -0.9964202         -0.9883587         -0.9924549
## 6:         0.009344434         -0.9948136         -0.9887145         -0.9922663
##    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 tBodyGyroJerk-mean-X tBodyGyroJerk-mean-Y
## 1:      -0.9766234      -0.9922053          -0.09916740          -0.05551737
## 2:      -0.9890458      -0.9891212          -0.11050283          -0.04481873
## 3:      -0.9935518      -0.9863787          -0.10848567          -0.04241031
```

```
## 4:       -0.9924073       -0.9875542        -0.09116989         -0.03633262
## 5:       -0.9923781       -0.9874019        -0.09077010         -0.03763253
## 6:       -0.9921175       -0.9830768        -0.09424758         -0.04335526
##     tBodyGyroJerk-mean-Z tBodyGyroJerk-std-X tBodyGyroJerk-std-Y
## 1:         -0.06198580         -0.9921107         -0.9925193
## 2:         -0.05924282         -0.9898726         -0.9972926
## 3:         -0.05582883         -0.9884618         -0.9956321
## 4:         -0.06046466         -0.9911194         -0.9966410
## 5:         -0.05828932         -0.9913545         -0.9964730
## 6:         -0.04193600         -0.9916216         -0.9960147
##     tBodyGyroJerk-std-Z tBodyAccMag-mean tBodyAccMag-std tGravityAccMag-mean
## 1:        -0.9920553       -0.9594339      -0.9505515          -0.9594339
## 2:        -0.9938510       -0.9792892      -0.9760571          -0.9792892
## 3:        -0.9915318       -0.9837031      -0.9880196          -0.9837031
## 4:        -0.9933289       -0.9865418      -0.9864213          -0.9865418
## 5:        -0.9945110       -0.9928271      -0.9912754          -0.9928271
## 6:        -0.9930906       -0.9942950      -0.9952490          -0.9942950
##     tGravityAccMag-std tBodyAccJerkMag-mean tBodyAccJerkMag-std
## 1:        -0.9505515         -0.9933059         -0.9943364
## 2:        -0.9760571         -0.9912535         -0.9916944
## 3:        -0.9880196         -0.9885313         -0.9903969
## 4:        -0.9864213         -0.9930780         -0.9933808
## 5:        -0.9912754         -0.9934800         -0.9958537
## 6:        -0.9952490         -0.9930177         -0.9954243
##     tBodyGyroMag-mean tBodyGyroMag-std tBodyGyroJerkMag-mean
## 1:        -0.9689591       -0.9643352         -0.9942478
## 2:        -0.9806831       -0.9837542         -0.9951232
## 3:        -0.9763171       -0.9860515         -0.9934032
## 4:        -0.9820599       -0.9873511         -0.9955022
## 5:        -0.9852037       -0.9890626         -0.9958076
## 6:        -0.9858944       -0.9864403         -0.9952748
##     tBodyGyroJerkMag-std fBodyAcc-mean-X fBodyAcc-mean-Y fBodyAcc-mean-Z
## 1:         -0.9913676       -0.9947832      -0.9829841       -0.9392687
## 2:         -0.9961016       -0.9974507      -0.9768517       -0.9735227
## 3:         -0.9950910       -0.9935941      -0.9725115       -0.9833040
## 4:         -0.9952666       -0.9954906      -0.9835697       -0.9910798
## 5:         -0.9952580       -0.9972859      -0.9823010       -0.9883694
## 6:         -0.9952050       -0.9966567      -0.9869395       -0.9927386
##     fBodyAcc-std-X fBodyAcc-std-Y fBodyAcc-std-Z fBodyAccJerk-mean-X
## 1:   -0.9954217     -0.9831330     -0.9061650         -0.9923325
## 2:   -0.9986803     -0.9749298     -0.9554381         -0.9950322
## 3:   -0.9963128     -0.9655059     -0.9770493         -0.9909937
## 4:   -0.9963121     -0.9832444     -0.9902291         -0.9944466
## 5:   -0.9986065     -0.9801295     -0.9919150         -0.9962920
## 6:   -0.9976438     -0.9922637     -0.9970459         -0.9948507
##     fBodyAccJerk-mean-Y fBodyAccJerk-mean-Z fBodyAccJerk-std-X
## 1:        -0.9871699       -0.9896961         -0.9958207
## 2:        -0.9813115       -0.9897398         -0.9966523
## 3:        -0.9816423       -0.9875663         -0.9912488
## 4:        -0.9887272       -0.9913542         -0.9913783
## 5:        -0.9887900       -0.9906244         -0.9969025
## 6:        -0.9882443       -0.9901575         -0.9952180
##     fBodyAccJerk-std-Y fBodyAccJerk-std-Z fBodyGyro-mean-X fBodyGyro-mean-Y
## 1:        -0.9909363       -0.9970517      -0.9865744       -0.9817615
```

```
##   2:         -0.9820839        -0.9926268        -0.9773867        -0.9925300
##   3:         -0.9814148        -0.9904159        -0.9754332        -0.9937147
##   4:         -0.9869269        -0.9943908        -0.9871096        -0.9936015
##   5:         -0.9886067        -0.9929065        -0.9824465        -0.9929838
##   6:         -0.9901788        -0.9930667        -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
##      fBodyAccMag-mean fBodyAccMag-std fBodyBodyAccJerkMag-mean
##   1:        -0.9521547       -0.9561340                -0.9937257
##   2:        -0.9808566       -0.9758658                -0.9903355
##   3:        -0.9877948       -0.9890155                -0.9892801
##   4:        -0.9875187       -0.9867420                -0.9927689
##   5:        -0.9935909       -0.9900635                -0.9955228
##   6:        -0.9948360       -0.9952833                -0.9947329
##      fBodyBodyAccJerkMag-std fBodyBodyGyroMag-mean fBodyBodyGyroMag-std
##   1:              -0.9937550           -0.9801349           -0.9613094
##   2:              -0.9919603           -0.9882956           -0.9833219
##   3:              -0.9908667           -0.9892548           -0.9860277
##   4:              -0.9916998           -0.9894128           -0.9878358
##   5:              -0.9943890           -0.9914330           -0.9890594
##   6:              -0.9951562           -0.9905000           -0.9858609
##      fBodyBodyGyroJerkMag-mean fBodyBodyGyroJerkMag-std
##   1:                -0.9919904               -0.9906975
##   2:                -0.9958539               -0.9963995
##   3:                -0.9950305               -0.9951274
##   4:                -0.9952207               -0.9952369
##   5:                -0.9950928               -0.9954648
##   6:                -0.9951433               -0.9952387
```

```
x_test <- fread(file.path(cur_path, "UCI HAR Dataset/test/X_test.txt"))
x_test_interested <- x_test[, interested_features, with = FALSE]
setnames(x_test_interested, colnames(x_test_interested), measurements)
activities_test <- fread(file.path(cur_path, "UCI HAR Dataset/test/Y_test.txt"), col.names = c("activity
subject_test <- fread(file.path(cur_path, "UCI HAR Dataset/test/subject_test.txt"), col.names = c("subj
x_test_interested <- cbind(subject_test, activities_test, x_test_interested)
head(x_test_interested)
```

follow the same steps for test data

```
##      subject_num activity tBodyAcc-mean-X tBodyAcc-mean-Y tBodyAcc-mean-Z
##   1:           2        5       0.2571778     -0.02328523     -0.01465376
##   2:           2        5       0.2860267     -0.01316336     -0.11908252
##   3:           2        5       0.2754848     -0.02605042     -0.11815167
##   4:           2        5       0.2702982     -0.03261387     -0.11752018
##   5:           2        5       0.2748330     -0.02784779     -0.12952716
##   6:           2        5       0.2792199     -0.01862040     -0.11390197
##      tBodyAcc-std-X tBodyAcc-std-Y tBodyAcc-std-Z tGravityAcc-mean-X
##   1:     -0.9384040     -0.9200908     -0.6676833          0.9364893
##   2:     -0.9754147     -0.9674579     -0.9449582          0.9274036
```

```
## 3:      -0.9938190      -0.9699255      -0.9627480           0.9299150
## 4:      -0.9947428      -0.9732676      -0.9670907           0.9288814
## 5:      -0.9938525      -0.9674455      -0.9782950           0.9265997
## 6:      -0.9944552      -0.9704169      -0.9653163           0.9256632
##    tGravityAcc-mean-Y tGravityAcc-mean-Z tGravityAcc-std-X tGravityAcc-std-Y
## 1:        -0.2827192          0.1152882        -0.9254273        -0.9370141
## 2:        -0.2892151          0.1525683        -0.9890571        -0.9838872
## 3:        -0.2875128          0.1460856        -0.9959365        -0.9882505
## 4:        -0.2933958          0.1429259        -0.9931392        -0.9704192
## 5:        -0.3029609          0.1383067        -0.9955746        -0.9709604
## 6:        -0.3089397          0.1305608        -0.9988423        -0.9907387
##    tGravityAcc-std-Z tBodyAccJerk-mean-X tBodyAccJerk-mean-Y
## 1:        -0.5642884          0.07204601         0.045754401
## 2:        -0.9647811          0.07018069        -0.017876016
## 3:        -0.9815796          0.06936778        -0.004908146
## 4:        -0.9915917          0.07485289         0.032274322
## 5:        -0.9680853          0.07837679         0.022276764
## 6:        -0.9712319          0.07598039         0.017519217
##    tBodyAccJerk-mean-Z tBodyAccJerk-std-X tBodyAccJerk-std-Y tBodyAccJerk-std-Z
## 1:        -0.106042660         -0.9066828         -0.9380164         -0.9359358
## 2:        -0.001720629         -0.9492040         -0.9726989         -0.9777267
## 3:        -0.013672983         -0.9910699         -0.9714041         -0.9728674
## 4:         0.012141275         -0.9908016         -0.9728957         -0.9759253
## 5:         0.002748499         -0.9920724         -0.9786700         -0.9866120
## 6:         0.008208061         -0.9938344         -0.9791029         -0.9876064
##    tBodyGyro-mean-X tBodyGyro-mean-Y tBodyGyro-mean-Z tBodyGyro-std-X
## 1:       0.119976160      -0.09179234       0.18962854      -0.8830891
## 2:      -0.001552463      -0.18729119       0.18070522      -0.9255665
## 3:      -0.048212671      -0.16627974       0.15417437      -0.9729882
## 4:      -0.056641577      -0.12601846       0.11833718      -0.9677905
## 5:      -0.059992128      -0.08472343       0.07865926      -0.9746560
## 6:      -0.039697949      -0.06682849       0.07054732      -0.9798784
##    tBodyGyro-std-Y tBodyGyro-std-Z tBodyGyroJerk-mean-X tBodyGyroJerk-mean-Y
## 1:      -0.8161636      -0.9408812          -0.20489621          -0.17448771
## 2:      -0.9295992      -0.9675810          -0.13866849          -0.02580207
## 3:      -0.9785106      -0.9756483          -0.09780967          -0.03421327
## 4:      -0.9751338      -0.9632327          -0.10223178          -0.04471346
## 5:      -0.9779511      -0.9676287          -0.09184994          -0.02900502
## 6:      -0.9764628      -0.9634617          -0.09273955          -0.03213821
##    tBodyGyroJerk-mean-Z tBodyGyroJerk-std-X tBodyGyroJerk-std-Y
## 1:        -0.09338934         -0.9012242         -0.9108601
## 2:        -0.07141841         -0.9623042         -0.9562894
## 3:        -0.06002840         -0.9841669         -0.9879399
## 4:        -0.05343650         -0.9841709         -0.9895542
## 5:        -0.06123535         -0.9884738         -0.9918773
## 6:        -0.07257549         -0.9894167         -0.9894940
##    tBodyGyroJerk-std-Z tBodyAccMag-mean tBodyAccMag-std tGravityAccMag-mean
## 1:        -0.9392504        -0.8669294        -0.7051911        -0.8669294
## 2:        -0.9813408        -0.9689614        -0.9539024        -0.9689614
## 3:        -0.9761876        -0.9762282        -0.9790834        -0.9762282
## 4:        -0.9807240        -0.9743245        -0.9770159        -0.9743245
## 5:        -0.9819836        -0.9758356        -0.9768934        -0.9758356
## 6:        -0.9777794        -0.9817163        -0.9777039        -0.9817163
##    tGravityAccMag-std tBodyAccJerkMag-mean tBodyAccJerkMag-std
```

```
## 1:           -0.7051911              -0.9297665              -0.8959942
## 2:           -0.9539024              -0.9737168              -0.9410078
## 3:           -0.9790834              -0.9816177              -0.9713710
## 4:           -0.9770159              -0.9827121              -0.9748075
## 5:           -0.9768934              -0.9869079              -0.9888539
## 6:           -0.9777039              -0.9873357              -0.9919970
##      tBodyGyroMag-mean tBodyGyroMag-std tBodyGyroJerkMag-mean
## 1:          -0.7955439       -0.7620732              -0.9251949
## 2:          -0.8984331       -0.9108583              -0.9733934
## 3:          -0.9391936       -0.9717763              -0.9867480
## 4:          -0.9471844       -0.9703682              -0.9888204
## 5:          -0.9574192       -0.9694995              -0.9900621
## 6:          -0.9697442       -0.9732947              -0.9878482
##      tBodyGyroJerkMag-std fBodyAcc-mean-X fBodyAcc-mean-Y fBodyAcc-mean-Z
## 1:            -0.8943436      -0.9185097      -0.9182132      -0.7890915
## 2:            -0.9440900      -0.9609030      -0.9644333      -0.9566748
## 3:            -0.9844015      -0.9919063      -0.9650336      -0.9668996
## 4:            -0.9855681      -0.9930298      -0.9682839      -0.9669116
## 5:            -0.9904189      -0.9924042      -0.9692072      -0.9796527
## 6:            -0.9890428      -0.9938427      -0.9707293      -0.9755771
##      fBodyAcc-std-X fBodyAcc-std-Y fBodyAcc-std-Z fBodyAccJerk-mean-X
## 1:      -0.9482903     -0.9251369     -0.6363167          -0.8996332
## 2:      -0.9843500     -0.9701748     -0.9418619          -0.9435190
## 3:      -0.9947537     -0.9736959     -0.9622866          -0.9910295
## 4:      -0.9955936     -0.9769176     -0.9689579          -0.9905362
## 5:      -0.9945037     -0.9674681     -0.9782399          -0.9914800
## 6:      -0.9946471     -0.9710160     -0.9614438          -0.9937759
##      fBodyAccJerk-mean-Y fBodyAccJerk-mean-Z fBodyAccJerk-std-X
## 1:           -0.9374850          -0.9235514          -0.9244291
## 2:           -0.9691623          -0.9734489          -0.9616312
## 3:           -0.9733689          -0.9717030          -0.9919122
## 4:           -0.9724525          -0.9703374          -0.9919600
## 5:           -0.9798346          -0.9834930          -0.9935709
## 6:           -0.9789845          -0.9860986          -0.9944514
##      fBodyAccJerk-std-Y fBodyAccJerk-std-Z fBodyGyro-mean-X fBodyGyro-mean-Y
## 1:           -0.9432104          -0.9478915      -0.8235579      -0.8079160
## 2:           -0.9800263          -0.9807873      -0.9225130      -0.9264957
## 3:           -0.9709857          -0.9723222      -0.9728456      -0.9808333
## 4:           -0.9754341          -0.9806211      -0.9715016      -0.9813450
## 5:           -0.9786966          -0.9885033      -0.9764045      -0.9804043
## 6:           -0.9807585          -0.9875569      -0.9797034      -0.9805261
##      fBodyGyro-mean-Z fBodyGyro-std-X fBodyGyro-std-Y fBodyGyro-std-Z
## 1:         -0.9179126      -0.9032627      -0.8226770      -0.9561651
## 2:         -0.9682295      -0.9270506      -0.9320107      -0.9701434
## 3:         -0.9720602      -0.9731979      -0.9771945      -0.9790953
## 4:         -0.9667055      -0.9671856      -0.9719094      -0.9652755
## 5:         -0.9687820      -0.9743979      -0.9765654      -0.9700165
## 6:         -0.9602064      -0.9800146      -0.9742469      -0.9678163
##      fBodyAccMag-mean fBodyAccMag-std fBodyBodyAccJerkMag-mean
## 1:        -0.7909464      -0.7110740              -0.8950612
## 2:        -0.9541266      -0.9597458              -0.9454372
## 3:        -0.9756497      -0.9837843              -0.9710690
## 4:        -0.9733931      -0.9821196              -0.9716545
## 5:        -0.9777390      -0.9788381              -0.9874888
```

```
## 6:         -0.9780025        -0.9798756                 -0.9912947
##     fBodyBodyAccJerkMag-std fBodyBodyGyroMag-mean fBodyBodyGyroMag-std
## 1:              -0.8963596              -0.7706100              -0.7971128
## 2:              -0.9341520              -0.9244608              -0.9167741
## 3:              -0.9703078              -0.9752095              -0.9739984
## 4:              -0.9784844              -0.9762973              -0.9712482
## 5:              -0.9897160              -0.9770070              -0.9696193
## 6:              -0.9917440              -0.9770345              -0.9750513
##     fBodyBodyGyroJerkMag-mean fBodyBodyGyroJerkMag-std
## 1:                -0.8901655                -0.9073076
## 2:                -0.9519774                -0.9382124
## 3:                -0.9856888                -0.9832727
## 4:                -0.9855619                -0.9858429
## 5:                -0.9904980                -0.9905719
## 6:                -0.9887326                -0.9898050
```

```r
merged <- rbind(x_train_interested, x_test_interested)
```

merge train and test data

```r
merged[["activity"]] <- factor(merged[, activity], levels = activity_labels[["class_labels"]], labels =
head(merged)
```

convert class labels to activity name

```
##     subject_num activity tBodyAcc-mean-X tBodyAcc-mean-Y tBodyAcc-mean-Z
## 1:            1 STANDING       0.2885845     -0.02029417      -0.1329051
## 2:            1 STANDING       0.2784188     -0.01641057      -0.1235202
## 3:            1 STANDING       0.2796531     -0.01946716      -0.1134617
## 4:            1 STANDING       0.2791739     -0.02620065      -0.1232826
## 5:            1 STANDING       0.2766288     -0.01656965      -0.1153619
## 6:            1 STANDING       0.2771988     -0.01009785      -0.1051373
##     tBodyAcc-std-X tBodyAcc-std-Y tBodyAcc-std-Z tGravityAcc-mean-X
## 1:      -0.9952786     -0.9831106     -0.9135264          0.9633961
## 2:      -0.9982453     -0.9753002     -0.9603220          0.9665611
## 3:      -0.9953796     -0.9671870     -0.9789440          0.9668781
## 4:      -0.9960915     -0.9834027     -0.9906751          0.9676152
## 5:      -0.9981386     -0.9808173     -0.9904816          0.9682244
## 6:      -0.9973350     -0.9904868     -0.9954200          0.9679482
##     tGravityAcc-mean-Y tGravityAcc-mean-Z tGravityAcc-std-X tGravityAcc-std-Y
## 1:         -0.1408397         0.11537494        -0.9852497        -0.9817084
## 2:         -0.1415513         0.10937881        -0.9974113        -0.9894474
## 3:         -0.1420098         0.10188392        -0.9995740        -0.9928658
## 4:         -0.1439765         0.09985014        -0.9966456        -0.9813928
## 5:         -0.1487502         0.09448590        -0.9984293        -0.9880982
## 6:         -0.1482100         0.09190972        -0.9989793        -0.9867539
##     tGravityAcc-std-Z tBodyAccJerk-mean-X tBodyAccJerk-mean-Y
## 1:         -0.8776250          0.07799634         0.005000803
## 2:         -0.9316387          0.07400671         0.005771104
## 3:         -0.9929172          0.07363596         0.003104037
## 4:         -0.9784764          0.07732061         0.020057642
## 5:         -0.9787449          0.07344436         0.019121574
## 6:         -0.9973064          0.07793244         0.018684046
```

```
##      tBodyAccJerk-mean-Z tBodyAccJerk-std-X tBodyAccJerk-std-Y tBodyAccJerk-std-Z
## 1:         -0.067830808        -0.9935191        -0.9883600        -0.9935750
## 2:          0.029376633        -0.9955481        -0.9810636        -0.9918457
## 3:         -0.009045631        -0.9907428        -0.9809556        -0.9896866
## 4:         -0.009864772        -0.9926974        -0.9875527        -0.9934976
## 5:          0.016779979        -0.9964202        -0.9883587        -0.9924549
## 6:          0.009344434        -0.9948136        -0.9887145        -0.9922663
##      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 tBodyGyroJerk-mean-X tBodyGyroJerk-mean-Y
## 1:      -0.9766234      -0.9922053         -0.09916740         -0.05551737
## 2:      -0.9890458      -0.9891212         -0.11050283         -0.04481873
## 3:      -0.9935518      -0.9863787         -0.10848567         -0.04241031
## 4:      -0.9924073      -0.9875542         -0.09116989         -0.03633262
## 5:      -0.9923781      -0.9874019         -0.09077010         -0.03763253
## 6:      -0.9921175      -0.9830768         -0.09424758         -0.04335526
##      tBodyGyroJerk-mean-Z tBodyGyroJerk-std-X tBodyGyroJerk-std-Y
## 1:          -0.06198580        -0.9921107        -0.9925193
## 2:          -0.05924282        -0.9898726        -0.9972926
## 3:          -0.05582883        -0.9884618        -0.9956321
## 4:          -0.06046466        -0.9911194        -0.9966410
## 5:          -0.05828932        -0.9913545        -0.9964730
## 6:          -0.04193600        -0.9916216        -0.9960147
##      tBodyGyroJerk-std-Z tBodyAccMag-mean tBodyAccMag-std tGravityAccMag-mean
## 1:          -0.9920553      -0.9594339      -0.9505515      -0.9594339
## 2:          -0.9938510      -0.9792892      -0.9760571      -0.9792892
## 3:          -0.9915318      -0.9837031      -0.9880196      -0.9837031
## 4:          -0.9933289      -0.9865418      -0.9864213      -0.9865418
## 5:          -0.9945110      -0.9928271      -0.9912754      -0.9928271
## 6:          -0.9930906      -0.9942950      -0.9952490      -0.9942950
##      tGravityAccMag-std tBodyAccJerkMag-mean tBodyAccJerkMag-std
## 1:          -0.9505515         -0.9933059         -0.9943364
## 2:          -0.9760571         -0.9912535         -0.9916944
## 3:          -0.9880196         -0.9885313         -0.9903969
## 4:          -0.9864213         -0.9930780         -0.9933808
## 5:          -0.9912754         -0.9934800         -0.9958537
## 6:          -0.9952490         -0.9930177         -0.9954243
##      tBodyGyroMag-mean tBodyGyroMag-std tBodyGyroJerkMag-mean
## 1:         -0.9689591      -0.9643352         -0.9942478
## 2:         -0.9806831      -0.9837542         -0.9951232
## 3:         -0.9763171      -0.9860515         -0.9934032
## 4:         -0.9820599      -0.9873511         -0.9955022
## 5:         -0.9852037      -0.9890626         -0.9958076
## 6:         -0.9858944      -0.9864403         -0.9952748
##      tBodyGyroJerkMag-std fBodyAcc-mean-X fBodyAcc-mean-Y fBodyAcc-mean-Z
## 1:          -0.9913676      -0.9947832      -0.9829841      -0.9392687
## 2:          -0.9961016      -0.9974507      -0.9768517      -0.9735227
## 3:          -0.9950910      -0.9935941      -0.9725115      -0.9833040
## 4:          -0.9952666      -0.9954906      -0.9835697      -0.9910798
```

```
## 5:           -0.9952580       -0.9972859       -0.9823010          -0.9883694
## 6:           -0.9952050       -0.9966567       -0.9869395          -0.9927386
##     fBodyAcc-std-X fBodyAcc-std-Y fBodyAcc-std-Z fBodyAccJerk-mean-X
## 1:    -0.9954217     -0.9831330     -0.9061650          -0.9923325
## 2:    -0.9986803     -0.9749298     -0.9554381          -0.9950322
## 3:    -0.9963128     -0.9655059     -0.9770493          -0.9909937
## 4:    -0.9963121     -0.9832444     -0.9902291          -0.9944466
## 5:    -0.9986065     -0.9801295     -0.9919150          -0.9962920
## 6:    -0.9976438     -0.9922637     -0.9970459          -0.9948507
##     fBodyAccJerk-mean-Y fBodyAccJerk-mean-Z fBodyAccJerk-std-X
## 1:          -0.9871699          -0.9896961          -0.9958207
## 2:          -0.9813115          -0.9897398          -0.9966523
## 3:          -0.9816423          -0.9875663          -0.9912488
## 4:          -0.9887272          -0.9913542          -0.9913783
## 5:          -0.9887900          -0.9906244          -0.9969025
## 6:          -0.9882443          -0.9901575          -0.9952180
##     fBodyAccJerk-std-Y fBodyAccJerk-std-Z fBodyGyro-mean-X fBodyGyro-mean-Y
## 1:         -0.9909363         -0.9970517      -0.9865744       -0.9817615
## 2:         -0.9820839         -0.9926268      -0.9773867       -0.9925300
## 3:         -0.9814148         -0.9904159      -0.9754332       -0.9937147
## 4:         -0.9869269         -0.9943908      -0.9871096       -0.9936015
## 5:         -0.9886067         -0.9929065      -0.9824465       -0.9929838
## 6:         -0.9901788         -0.9930667      -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
##     fBodyAccMag-mean fBodyAccMag-std fBodyBodyAccJerkMag-mean
## 1:       -0.9521547      -0.9561340               -0.9937257
## 2:       -0.9808566      -0.9758658               -0.9903355
## 3:       -0.9877948      -0.9890155               -0.9892801
## 4:       -0.9875187      -0.9867420               -0.9927689
## 5:       -0.9935909      -0.9900635               -0.9955228
## 6:       -0.9948360      -0.9952833               -0.9947329
##     fBodyBodyAccJerkMag-std fBodyBodyGyroMag-mean fBodyBodyGyroMag-std
## 1:              -0.9937550            -0.9801349           -0.9613094
## 2:              -0.9919603            -0.9882956           -0.9833219
## 3:              -0.9908667            -0.9892548           -0.9860277
## 4:              -0.9916998            -0.9894128           -0.9878358
## 5:              -0.9943890            -0.9914330           -0.9890594
## 6:              -0.9951562            -0.9905000           -0.9858609
##     fBodyBodyGyroJerkMag-mean fBodyBodyGyroJerkMag-std
## 1:                -0.9919904               -0.9906975
## 2:                -0.9958539               -0.9963995
## 3:                -0.9950305               -0.9951274
## 4:                -0.9952207               -0.9952369
## 5:                -0.9950928               -0.9954648
## 6:                -0.9951433               -0.9952387
```

```r
merged <- melt(data = merged, id = c("subject_num", "activity"))
```

```
merged <- dcast(data = merged, subject_num + activity ~ variable, fun.aggregate = mean)
head(merged)
```

find the average of each variable

```
##   subject_num          activity tBodyAcc-mean-X tBodyAcc-mean-Y
## 1           1           WALKING       0.2773308    -0.017383819
## 2           1   WALKING_UPSTAIRS       0.2554617    -0.023953149
## 3           1 WALKING_DOWNSTAIRS       0.2891883    -0.009918505
## 4           1           SITTING       0.2612376    -0.001308288
## 5           1          STANDING       0.2789176    -0.016137590
## 6           1            LAYING       0.2215982    -0.040513953
##   tBodyAcc-mean-Z tBodyAcc-std-X tBodyAcc-std-Y tBodyAcc-std-Z
## 1      -0.1111481    -0.28374026    0.114461337    -0.26002790
## 2      -0.0973020    -0.35470803   -0.002320265    -0.01947924
## 3      -0.1075662     0.03003534   -0.031935943    -0.23043421
## 4      -0.1045442    -0.97722901   -0.922618642    -0.93958629
## 5      -0.1106018    -0.99575990   -0.973190056    -0.97977588
## 6      -0.1132036    -0.92805647   -0.836827406    -0.82606140
##   tGravityAcc-mean-X tGravityAcc-mean-Y tGravityAcc-mean-Z tGravityAcc-std-X
## 1          0.9352232         -0.2821650        -0.06810286        -0.9766096
## 2          0.8933511         -0.3621534        -0.07540294        -0.9563670
## 3          0.9318744         -0.2666103        -0.06211996        -0.9505598
## 4          0.8315099          0.2044116         0.33204370        -0.9684571
## 5          0.9429520         -0.2729838         0.01349058        -0.9937630
## 6         -0.2488818          0.7055498         0.44581772        -0.8968300
##   tGravityAcc-std-Y tGravityAcc-std-Z tBodyAccJerk-mean-X tBodyAccJerk-mean-Y
## 1        -0.9713060        -0.9477172          0.07404163          0.0282721096
## 2        -0.9528492        -0.9123794          0.10137273          0.0194863076
## 3        -0.9370187        -0.8959397          0.05415532          0.0296504490
## 4        -0.9355171        -0.9490409          0.07748252         -0.0006191028
## 5        -0.9812260        -0.9763241          0.07537665          0.0079757309
## 6        -0.9077200        -0.8523663          0.08108653          0.0038382040
##   tBodyAccJerk-mean-Z tBodyAccJerk-std-X tBodyAccJerk-std-Y tBodyAccJerk-std-Z
## 1        -0.004168406        -0.11361560          0.0670025         -0.5026998
## 2        -0.045562545        -0.44684389         -0.3782744         -0.7065935
## 3        -0.010971973        -0.01228386         -0.1016014         -0.3457350
## 4        -0.003367792        -0.98643071         -0.9813720         -0.9879108
## 5        -0.003685250        -0.99460454         -0.9856487         -0.9922512
## 6         0.010834236        -0.95848211         -0.9241493         -0.9548551
##   tBodyGyro-mean-X tBodyGyro-mean-Y tBodyGyro-mean-Z tBodyGyro-std-X
## 1      -0.04183096      -0.06953005       0.08494482      -0.4735355
## 2       0.05054938      -0.16617002       0.05835955      -0.5448711
## 3      -0.03507819      -0.09093713       0.09008501      -0.4580305
## 4      -0.04535006      -0.09192415       0.06293138      -0.9772113
## 5      -0.02398773      -0.05939722       0.07480075      -0.9871919
## 6      -0.01655309      -0.06448612       0.14868944      -0.8735439
##   tBodyGyro-std-Y tBodyGyro-std-Z tBodyGyroJerk-mean-X tBodyGyroJerk-mean-Y
## 1     -0.054607769      -0.3442666          -0.08999754          -0.03984287
## 2      0.004105184      -0.5071687          -0.12223277          -0.04214859
## 3     -0.126349195      -0.1247025          -0.07395920          -0.04399028
## 4     -0.966473895      -0.9414259          -0.09367938          -0.04021181
## 5     -0.987734440      -0.9806456          -0.09960921          -0.04406279
## 6     -0.951090440      -0.9082847          -0.10727095          -0.04151729
```

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```
##     tBodyGyroJerk-mean-Z tBodyGyroJerk-std-X tBodyGyroJerk-std-Y
## 1           -0.04613093          -0.2074219          -0.3044685
## 2           -0.04071255          -0.6147865          -0.6016967
## 3           -0.02704611          -0.4870273          -0.2388248
## 4           -0.04670263          -0.9917316          -0.9895181
## 5           -0.04895055          -0.9929451          -0.9951379
## 6           -0.07405012          -0.9186085          -0.9679072
##     tBodyGyroJerk-std-Z tBodyAccMag-mean tBodyAccMag-std tGravityAccMag-mean
## 1            -0.4042555      -0.13697118     -0.21968865         -0.13697118
## 2            -0.6063320      -0.12992763     -0.32497093         -0.12992763
## 3            -0.2687615       0.02718829      0.01988435          0.02718829
## 4            -0.9879358      -0.94853679     -0.92707842         -0.94853679
## 5            -0.9921085      -0.98427821     -0.98194293         -0.98427821
## 6            -0.9577902      -0.84192915     -0.79514486         -0.84192915
##     tGravityAccMag-std tBodyAccJerkMag-mean tBodyAccJerkMag-std tBodyGyroMag-mean
## 1          -0.21968865          -0.14142881         -0.07447175       -0.16097955
## 2          -0.32497093          -0.46650345         -0.47899162       -0.12673559
## 3           0.01988435          -0.08944748         -0.02578772       -0.07574125
## 4          -0.92707842          -0.98736420         -0.98412002       -0.93089249
## 5          -0.98194293          -0.99236779         -0.99309621       -0.97649379
## 6          -0.79514486          -0.95439626         -0.92824563       -0.87475955
##     tBodyGyroMag-std tBodyGyroJerkMag-mean tBodyGyroJerkMag-std fBodyAcc-mean-X
## 1         -0.1869784            -0.2987037           -0.3253249     -0.20279431
## 2         -0.1486193            -0.5948829           -0.6485530     -0.40432178
## 3         -0.2257244            -0.2954638           -0.3065106      0.03822918
## 4         -0.9345318            -0.9919763           -0.9883087     -0.97964124
## 5         -0.9786900            -0.9949668           -0.9947332     -0.99524993
## 6         -0.8190102            -0.9634610           -0.9358410     -0.93909905
##     fBodyAcc-mean-Y fBodyAcc-mean-Z fBodyAcc-std-X fBodyAcc-std-Y fBodyAcc-std-Z
## 1      0.089712726      -0.3315601    -0.31913472     0.05604001    -0.27968675
## 2     -0.190976721      -0.4333497    -0.33742819     0.02176951     0.08595655
## 3      0.001549908      -0.2255745     0.02433084    -0.11296374    -0.29792789
## 4     -0.944084550      -0.9591849    -0.97641231    -0.91727501    -0.93446956
## 5     -0.977070848      -0.9852971    -0.99602835    -0.97229310    -0.97793726
## 6     -0.867065205      -0.8826669    -0.92443743    -0.83362556    -0.81289156
##     fBodyAccJerk-mean-X fBodyAccJerk-mean-Y fBodyAccJerk-mean-Z
## 1           -0.17054696         -0.03522552          -0.4689992
## 2           -0.47987525         -0.41344459          -0.6854744
## 3           -0.02766387         -0.12866716          -0.2883347
## 4           -0.98659702         -0.98157947          -0.9860531
## 5           -0.99463080         -0.98541870          -0.9907522
## 6           -0.95707388         -0.92246261          -0.9480609
##     fBodyAccJerk-std-X fBodyAccJerk-std-Y fBodyAccJerk-std-Z fBodyGyro-mean-X
## 1          -0.1335866          0.1067399         -0.5347134       -0.3390322
## 2          -0.4619070         -0.3817771         -0.7260402       -0.4926117
## 3          -0.0863279         -0.1345800         -0.4017215       -0.3524496
## 4          -0.9874930         -0.9825139         -0.9883392       -0.9761615
## 5          -0.9950738         -0.9870182         -0.9923498       -0.9863868
## 6          -0.9641607         -0.9322179         -0.9605870       -0.8502492
##     fBodyGyro-mean-Y fBodyGyro-mean-Z fBodyGyro-std-X fBodyGyro-std-Y
## 1        -0.10305942      -0.25594094      -0.5166919     -0.03350816
## 2        -0.31947461      -0.45359721      -0.5658925      0.15153891
## 3        -0.05570225      -0.03186943      -0.4954225     -0.18141473
## 4        -0.97583859      -0.95131554      -0.9779042     -0.96234504
```

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```
## 5      -0.98898446      -0.98077312      -0.9874971      -0.98710773
## 6      -0.95219149      -0.90930272      -0.8822965      -0.95123205
##    fBodyGyro-std-Z fBodyAccMag-mean fBodyAccMag-std fBodyBodyAccJerkMag-mean
## 1      -0.4365622      -0.12862345      -0.3980326            -0.05711940
## 2      -0.5717078      -0.35239594      -0.4162601            -0.44265216
## 3      -0.2384436       0.09658453      -0.1865303             0.02621849
## 4      -0.9439178      -0.94778292      -0.9284448            -0.98526213
## 5      -0.9823453      -0.98535636      -0.9823138            -0.99254248
## 6      -0.9165825      -0.86176765      -0.7983009            -0.93330036
##    fBodyBodyAccJerkMag-std fBodyBodyGyroMag-mean fBodyBodyGyroMag-std
## 1            -0.1034924            -0.1992526          -0.3210180
## 2            -0.5330599            -0.3259615          -0.1829855
## 3            -0.1040523            -0.1857203          -0.3983504
## 4            -0.9816062            -0.9584356          -0.9321984
## 5            -0.9925360            -0.9846176          -0.9784661
## 6            -0.9218040            -0.8621902          -0.8243194
##    fBodyBodyGyroJerkMag-mean fBodyBodyGyroJerkMag-std
## 1            -0.3193086            -0.3816019
## 2            -0.6346651            -0.6939305
## 3            -0.2819634            -0.3919199
## 4            -0.9897975            -0.9870496
## 5            -0.9948154            -0.9946711
## 6            -0.9423669            -0.9326607
```

```
fwrite(x = merged, file = 'tidyData.txt', quote = FALSE)
```

write the dataset