CodeBook

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This is the code book for describing the variables.

One of the most exciting areas in all of data science right now is wearable computing - see for example this article . Companies like Fitbit, Nike, and Jawbone Up are racing to develop the most advanced algorithms to attract new users. The data linked to from the course website represent data collected from the accelerometers from the Samsung Galaxy S smartphone. A full description is available at the site where the data was obtained:

http://archive.ics.uci.edu/ml/datasets/Human+Activity+Recognition+Using+Smartphones

Here are the data for the project:

https://d396qusza40orc.cloudfront.net/getdata%2Fprojectfiles%2FUCI%20HAR%20Dataset.zip

1. Variable Descriptions

Variable	Description
activities	The activity performed
subject	Subject ID
tbodyacc-mean-x	Mean time for acceleration of body for X direction
tbodyacc-mean-y	Mean time for acceleration of body for Y direction
tbodyacc-mean-z	Mean time for acceleration of body for Z direction
tbodyacc-std-x	Standard deviation of time for acceleration of body for X direction
tbodyacc-std-y	Standard deviation of time for acceleration of body for Y direction
tbodyacc-std-z	Standard deviation of time for acceleration of body for Z direction
tgravityacc-mean-x	Mean time of acceleration of gravity for X direction
tgravityacc-mean-y	Mean time of acceleration of gravity for Y direction
tgravityacc-mean-z	Mean time of acceleration of gravity for Z direction
tgravityacc-std-x	Standard deviation of time of acceleration of gravity for X direction
tgravityacc-std-y	Standard deviation of time of acceleration of gravity for Y direction
tgravityacc-std-z	Standard deviation of time of acceleration of gravity for Z direction
tbodyaccjerk-mean-x	Mean time of body acceleration jerk for X direction
tbodyaccjerk-mean-y	Mean time of body acceleration jerk for Y direction
tbodyaccjerk-mean-z	Mean time of body acceleration jerk for Z direction
tbodyaccjerk-std-x	Standard deviation of time of body acceleration jerk for X direction
tbodyaccjerk-std-y	Standard deviation of time of body acceleration jerk for Y direction
tbodyaccjerk-std-z	Standard deviation of time of body acceleration jerk for Z direction
tbodygyro-mean-x	Mean body gyroscope measurement for X direction
tbodygyro-mean-y	Mean body gyroscope measurement for Y direction
tbodygyro-mean-z	Mean body gyroscope measurement for Z direction
tbodygyro-std-x	Standard deviation of body gyroscope measurement for X direction
tbodygyro-std-y	Standard deviation of body gyroscope measurement for Y direction
tbodygyro-std-z	Standard deviation of body gyroscope measurement for Z direction
tbodygyrojerk-mean-x	Mean jerk signal of body for X direction
tbodygyrojerk-mean-y	Mean jerk signal of body for Y direction
tbodygyrojerk-mean-z	Mean jerk signal of body for Z direction
tbodygyrojerk-std-x	Standard deviation of jerk signal of body for X direction

Variable	Description
tbodygyrojerk-std-y	Standard deviation of jerk signal of body for Y direction
tbodygyrojerk-std-z	Standard deviation of jerk signal of body for Z direction
tbodyaccmag-mean	Mean magnitude of body Acc
tbodyaccmag-std	Standard deviation of magnitude of body Acc
tgravityaccmag-mean	Mean gravity acceleration magnitude
tgravityaccmag-std	Standard deviation of gravity acceleration magnitude
tbodyaccjerkmag-mean	Mean magnitude of body acceleration jerk
tbodyaccjerkmag-std	Standard deviation of magnitude of body acceleration jerk
tbodygyromag-mean	Mean magnitude of body gyroscope measurement
tbodygyromag-std	Standard deviation of magnitude of body gyroscope measurement
tbodygyrojerkmag-mean	Mean magnitude of body body gyroscope jerk measurement
tbodygyrojerkmag-std	Standard deviation of magnitude of body body gyroscope jerk measurement
fbodyacc-mean-x	Mean frequency of body acceleration for X direction
fbodyacc-mean-y	Mean frequency of body acceleration for Y direction
fbodyacc-mean-z	Mean frequency of body acceleration for Z direction
fbodyacc-std-x	Standard deviation of frequency of body acceleration for X direction
fbodyacc-std-y	Standard deviation of frequency of body acceleration for Y direction
fbodyacc-std-z	Standard deviation of frequency of body acceleration for Z direction
fbodyaccjerk-mean-x	Mean frequency of body accerlation jerk for X direction
fbodyaccjerk-mean-y	Mean frequency of body accerlation jerk for Y direction
fbodyaccjerk-mean-z	Mean frequency of body accerlation jerk for Z direction
fbodyaccjerk-std-x	Standard deviation frequency of body accerlation jerk for X direction
fbodyaccjerk-std-y	Standard deviation frequency of body accerlation jerk for Y direction
fbodyaccjerk-std-z	Standard deviation frequency of body accerlation jerk for Z direction
fbodygyro-mean-x	Mean frequency of body gyroscope measurement for X direction
fbodygyro-mean-y	Mean frequency of body gyroscope measurement for Y direction
fbodygyro-mean-z	Mean frequency of body gyroscope measurement for Z direction
fbodygyro-std-x	Standard deviation frequency of body gyroscope measurement for X direction
fbodygyro-std-y	Standard deviation frequency of body gyroscope measurement for Y direction
fbodygyro-std-z	Standard deviation frequency of body gyroscope measurement for Z direction
fbodyaccmag-mean	Mean frequency of body acceleration magnitude
fbodyaccmag-std	Standard deviation of frequency of body acceleration magnitude
fbodybodyaccjerkmag-mean	Mean frequency of body acceleration jerk magnitude
fbodybodyaccjerkmag-std	Standard deviation of frequency of body acceleration jerk magnitude
fbodybodygyromag-mean	Mean frequency of magnitude of body gyroscope measurement
fbodybodygyromag-std	Standard deviation of frequency of magnitude of body gyroscope measurement
fbodybodygyrojerkmag-mean	Mean frequency of magnitude of body gyroscope jerk measurement
fbodybodygyrojerkmag-std	Standard deviation frequency of magnitude of body gyroscope jerk measurement

2. Summary of merged data set in step 1

```
str(Data)
```

```
## 'data.frame':    10299 obs. of  563 variables:
##  $ tBodyAcc-mean()-X                  : num  0.289 0.278 0.28 0.279 0.277 ...
##  $ tBodyAcc-mean()-Y                  : num  -0.0203 -0.0164 -0.0195 -0.0262 -0.0166 ...
##  $ tBodyAcc-mean()-Z                  : num  -0.133 -0.124 -0.113 -0.123 -0.115 ...
##  $ tBodyAcc-std()-X                   : num  -0.995 -0.998 -0.995 -0.996 -0.998 ...
##  $ tBodyAcc-std()-Y                   : num  -0.983 -0.975 -0.967 -0.983 -0.981 ...
```

```
##  $ tBodyAcc-std()-Z                : num  -0.914 -0.96 -0.979 -0.991 -0.99 ...
##  $ tBodyAcc-mad()-X                : num  -0.995 -0.999 -0.997 -0.997 -0.998 ...
##  $ tBodyAcc-mad()-Y                : num  -0.983 -0.975 -0.964 -0.983 -0.98 ...
##  $ tBodyAcc-mad()-Z                : num  -0.924 -0.958 -0.977 -0.989 -0.99 ...
##  $ tBodyAcc-max()-X                : num  -0.935 -0.943 -0.939 -0.939 -0.942 ...
##  $ tBodyAcc-max()-Y                : num  -0.567 -0.558 -0.558 -0.576 -0.569 ...
##  $ tBodyAcc-max()-Z                : num  -0.744 -0.818 -0.818 -0.83 -0.825 ...
##  $ tBodyAcc-min()-X                : num  0.853 0.849 0.844 0.844 0.849 ...
##  $ tBodyAcc-min()-Y                : num  0.686 0.686 0.682 0.682 0.683 ...
##  $ tBodyAcc-min()-Z                : num  0.814 0.823 0.839 0.838 0.838 ...
##  $ tBodyAcc-sma()                  : num  -0.966 -0.982 -0.983 -0.986 -0.993 ...
##  $ tBodyAcc-energy()-X             : num  -1 -1 -1 -1 -1 ...
##  $ tBodyAcc-energy()-Y             : num  -1 -1 -1 -1 -1 ...
##  $ tBodyAcc-energy()-Z             : num  -0.995 -0.998 -0.999 -1 -1 ...
##  $ tBodyAcc-iqr()-X                : num  -0.994 -0.999 -0.997 -0.997 -0.998 ...
##  $ tBodyAcc-iqr()-Y                : num  -0.988 -0.978 -0.965 -0.984 -0.981 ...
##  $ tBodyAcc-iqr()-Z                : num  -0.943 -0.948 -0.975 -0.986 -0.991 ...
##  $ tBodyAcc-entropy()-X            : num  -0.408 -0.715 -0.592 -0.627 -0.787 ...
##  $ tBodyAcc-entropy()-Y            : num  -0.679 -0.501 -0.486 -0.851 -0.559 ...
##  $ tBodyAcc-entropy()-Z            : num  -0.602 -0.571 -0.571 -0.912 -0.761 ...
##  $ tBodyAcc-arCoeff()-X,1          : num  0.9293 0.6116 0.273 0.0614 0.3133 ...
##  $ tBodyAcc-arCoeff()-X,2          : num  -0.853 -0.3295 -0.0863 0.0748 -0.1312 ...
##  $ tBodyAcc-arCoeff()-X,3          : num  0.36 0.284 0.337 0.198 0.191 ...
##  $ tBodyAcc-arCoeff()-X,4          : num  -0.0585 0.2846 -0.1647 -0.2643 0.0869 ...
##  $ tBodyAcc-arCoeff()-Y,1          : num  0.2569 0.1157 0.0172 0.0725 0.2576 ...
##  $ tBodyAcc-arCoeff()-Y,2          : num  -0.2248 -0.091 -0.0745 -0.1553 -0.2725 ...
##  $ tBodyAcc-arCoeff()-Y,3          : num  0.264 0.294 0.342 0.323 0.435 ...
##  $ tBodyAcc-arCoeff()-Y,4          : num  -0.0952 -0.2812 -0.3326 -0.1708 -0.3154 ...
##  $ tBodyAcc-arCoeff()-Z,1          : num  0.279 0.086 0.239 0.295 0.44 ...
##  $ tBodyAcc-arCoeff()-Z,2          : num  -0.4651 -0.0222 -0.1362 -0.3061 -0.2691 ...
##  $ tBodyAcc-arCoeff()-Z,3          : num  0.4919 -0.0167 0.1739 0.4821 0.1794 ...
##  $ tBodyAcc-arCoeff()-Z,4          : num  -0.191 -0.221 -0.299 -0.47 -0.089 ...
##  $ tBodyAcc-correlation()-X,Y      : num  0.3763 -0.0134 -0.1247 -0.3057 -0.1558 ...
##  $ tBodyAcc-correlation()-X,Z      : num  0.4351 -0.0727 -0.1811 -0.3627 -0.1898 ...
##  $ tBodyAcc-correlation()-Y,Z      : num  0.661 0.579 0.609 0.507 0.599 ...
##  $ tGravityAcc-mean()-X            : num  0.963 0.967 0.967 0.968 0.968 ...
##  $ tGravityAcc-mean()-Y            : num  -0.141 -0.142 -0.142 -0.144 -0.149 ...
##  $ tGravityAcc-mean()-Z            : num  0.1154 0.1094 0.1019 0.0999 0.0945 ...
##  $ tGravityAcc-std()-X             : num  -0.985 -0.997 -1 -0.997 -0.998 ...
##  $ tGravityAcc-std()-Y             : num  -0.982 -0.989 -0.993 -0.981 -0.988 ...
##  $ tGravityAcc-std()-Z             : num  -0.878 -0.932 -0.993 -0.978 -0.979 ...
##  $ tGravityAcc-mad()-X             : num  -0.985 -0.998 -1 -0.996 -0.998 ...
##  $ tGravityAcc-mad()-Y             : num  -0.984 -0.99 -0.993 -0.981 -0.989 ...
##  $ tGravityAcc-mad()-Z             : num  -0.895 -0.933 -0.993 -0.978 -0.979 ...
##  $ tGravityAcc-max()-X             : num  0.892 0.892 0.892 0.894 0.894 ...
##  $ tGravityAcc-max()-Y             : num  -0.161 -0.161 -0.164 -0.164 -0.167 ...
##  $ tGravityAcc-max()-Z             : num  0.1247 0.1226 0.0946 0.0934 0.0917 ...
##  $ tGravityAcc-min()-X             : num  0.977 0.985 0.987 0.987 0.987 ...
##  $ tGravityAcc-min()-Y             : num  -0.123 -0.115 -0.115 -0.121 -0.122 ...
##  $ tGravityAcc-min()-Z             : num  0.0565 0.1028 0.1028 0.0958 0.0941 ...
##  $ tGravityAcc-sma()               : num  -0.375 -0.383 -0.402 -0.4 -0.4 ...
##  $ tGravityAcc-energy()-X          : num  0.899 0.908 0.909 0.911 0.912 ...
##  $ tGravityAcc-energy()-Y          : num  -0.971 -0.971 -0.97 -0.969 -0.967 ...
##  $ tGravityAcc-energy()-Z          : num  -0.976 -0.979 -0.982 -0.982 -0.984 ...
```

```
##  $ tGravityAcc-iqr()-X                : num  -0.984 -0.999 -1 -0.996 -0.998 ...
##  $ tGravityAcc-iqr()-Y                : num  -0.989 -0.99 -0.992 -0.981 -0.991 ...
##  $ tGravityAcc-iqr()-Z                : num  -0.918 -0.942 -0.993 -0.98 -0.98 ...
##  $ tGravityAcc-entropy()-X            : num  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 ...
##  $ tGravityAcc-entropy()-Y            : num  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 ...
##  $ tGravityAcc-entropy()-Z            : num  0.114 -0.21 -0.927 -0.596 -0.617 ...
##  $ tGravityAcc-arCoeff()-X,1          : num  -0.59042 -0.41006 0.00223 -0.06493 -0.25727 ...
##  $ tGravityAcc-arCoeff()-X,2          : num  0.5911 0.4139 0.0275 0.0754 0.2689 ...
##  $ tGravityAcc-arCoeff()-X,3          : num  -0.5918 -0.4176 -0.0567 -0.0858 -0.2807 ...
##  $ tGravityAcc-arCoeff()-X,4          : num  0.5925 0.4213 0.0855 0.0962 0.2926 ...
##  $ tGravityAcc-arCoeff()-Y,1          : num  -0.745 -0.196 -0.329 -0.295 -0.167 ...
##  $ tGravityAcc-arCoeff()-Y,2          : num  0.7209 0.1253 0.2705 0.2283 0.0899 ...
##  $ tGravityAcc-arCoeff()-Y,3          : num  -0.7124 -0.1056 -0.2545 -0.2063 -0.0663 ...
##  $ tGravityAcc-arCoeff()-Y,4          : num  0.7113 0.1091 0.2576 0.2048 0.0671 ...
##  $ tGravityAcc-arCoeff()-Z,1          : num  -0.995 -0.834 -0.705 -0.385 -0.237 ...
##  $ tGravityAcc-arCoeff()-Z,2          : num  0.996 0.834 0.714 0.386 0.239 ...
##  $ tGravityAcc-arCoeff()-Z,3          : num  -0.996 -0.834 -0.723 -0.387 -0.241 ...
##  $ tGravityAcc-arCoeff()-Z,4          : num  0.992 0.83 0.729 0.385 0.241 ...
##  $ tGravityAcc-correlation()-X,Y      : num  0.57 -0.831 -0.181 -0.991 -0.408 ...
##  $ tGravityAcc-correlation()-X,Z      : num  0.439 -0.866 0.338 -0.969 -0.185 ...
##  $ tGravityAcc-correlation()-Y,Z      : num  0.987 0.974 0.643 0.984 0.965 ...
##  $ tBodyAccJerk-mean()-X              : num  0.078 0.074 0.0736 0.0773 0.0734 ...
##  $ tBodyAccJerk-mean()-Y              : num  0.005 0.00577 0.0031 0.02006 0.01912 ...
##  $ tBodyAccJerk-mean()-Z              : num  -0.06783 0.02938 -0.00905 -0.00986 0.01678 ...
##  $ tBodyAccJerk-std()-X               : num  -0.994 -0.996 -0.991 -0.993 -0.996 ...
##  $ tBodyAccJerk-std()-Y               : num  -0.988 -0.981 -0.981 -0.988 -0.988 ...
##  $ tBodyAccJerk-std()-Z               : num  -0.994 -0.992 -0.99 -0.993 -0.992 ...
##  $ tBodyAccJerk-mad()-X               : num  -0.994 -0.996 -0.991 -0.994 -0.997 ...
##  $ tBodyAccJerk-mad()-Y               : num  -0.986 -0.979 -0.979 -0.986 -0.987 ...
##  $ tBodyAccJerk-mad()-Z               : num  -0.993 -0.991 -0.987 -0.991 -0.991 ...
##  $ tBodyAccJerk-max()-X               : num  -0.985 -0.995 -0.987 -0.987 -0.997 ...
##  $ tBodyAccJerk-max()-Y               : num  -0.992 -0.979 -0.979 -0.992 -0.992 ...
##  $ tBodyAccJerk-max()-Z               : num  -0.993 -0.992 -0.992 -0.99 -0.99 ...
##  $ tBodyAccJerk-min()-X               : num  0.99 0.993 0.988 0.988 0.994 ...
##  $ tBodyAccJerk-min()-Y               : num  0.992 0.992 0.992 0.993 0.993 ...
##  $ tBodyAccJerk-min()-Z               : num  0.991 0.989 0.989 0.993 0.986 ...
##  $ tBodyAccJerk-sma()                 : num  -0.994 -0.991 -0.988 -0.993 -0.994 ...
##  $ tBodyAccJerk-energy()-X            : num  -1 -1 -1 -1 -1 ...
##  $ tBodyAccJerk-energy()-Y            : num  -1 -1 -1 -1 -1 ...
##  $ tBodyAccJerk-energy()-Z            : num  -1 -1 -1 -1 -1 ...
##   [list output truncated]
```

3. Summary of data set with mean and standard deviation values in step 2

```
str(Data_Mean_Sd)
```

```
## 'data.frame':    10299 obs. of  68 variables:
##  $ tBodyAcc-mean()-X          : num  0.289 0.278 0.28 0.279 0.277 ...
##  $ tBodyAcc-mean()-Y          : num  -0.0203 -0.0164 -0.0195 -0.0262 -0.0166 ...
##  $ tBodyAcc-mean()-Z          : num  -0.133 -0.124 -0.113 -0.123 -0.115 ...
##  $ tBodyAcc-std()-X           : num  -0.995 -0.998 -0.995 -0.996 -0.998 ...
##  $ tBodyAcc-std()-Y           : num  -0.983 -0.975 -0.967 -0.983 -0.981 ...
```

```
##  $ tBodyAcc-std()-Z           : num  -0.914 -0.96 -0.979 -0.991 -0.99 ...
##  $ tGravityAcc-mean()-X       : num  0.963 0.967 0.967 0.968 0.968 ...
##  $ tGravityAcc-mean()-Y       : num  -0.141 -0.142 -0.142 -0.144 -0.149 ...
##  $ tGravityAcc-mean()-Z       : num  0.1154 0.1094 0.1019 0.0999 0.0945 ...
##  $ tGravityAcc-std()-X        : num  -0.985 -0.997 -1 -0.997 -0.998 ...
##  $ tGravityAcc-std()-Y        : num  -0.982 -0.989 -0.993 -0.981 -0.988 ...
##  $ tGravityAcc-std()-Z        : num  -0.878 -0.932 -0.993 -0.978 -0.979 ...
##  $ tBodyAccJerk-mean()-X      : num  0.078 0.074 0.0736 0.0773 0.0734 ...
##  $ tBodyAccJerk-mean()-Y      : num  0.005 0.00577 0.0031 0.02006 0.01912 ...
##  $ tBodyAccJerk-mean()-Z      : num  -0.06783 0.02938 -0.00905 -0.00986 0.01678 ...
##  $ tBodyAccJerk-std()-X       : num  -0.994 -0.996 -0.991 -0.993 -0.996 ...
##  $ tBodyAccJerk-std()-Y       : num  -0.988 -0.981 -0.981 -0.988 -0.988 ...
##  $ tBodyAccJerk-std()-Z       : num  -0.994 -0.992 -0.99 -0.993 -0.992 ...
##  $ tBodyGyro-mean()-X         : num  -0.0061 -0.0161 -0.0317 -0.0434 -0.034 ...
##  $ tBodyGyro-mean()-Y         : num  -0.0314 -0.0839 -0.1023 -0.0914 -0.0747 ...
##  $ tBodyGyro-mean()-Z         : num  0.1077 0.1006 0.0961 0.0855 0.0774 ...
##  $ tBodyGyro-std()-X          : num  -0.985 -0.983 -0.976 -0.991 -0.985 ...
##  $ tBodyGyro-std()-Y          : num  -0.977 -0.989 -0.994 -0.992 -0.992 ...
##  $ tBodyGyro-std()-Z          : num  -0.992 -0.989 -0.986 -0.988 -0.987 ...
##  $ tBodyGyroJerk-mean()-X     : num  -0.0992 -0.1105 -0.1085 -0.0912 -0.0908 ...
##  $ tBodyGyroJerk-mean()-Y     : num  -0.0555 -0.0448 -0.0424 -0.0363 -0.0376 ...
##  $ tBodyGyroJerk-mean()-Z     : num  -0.062 -0.0592 -0.0558 -0.0605 -0.0583 ...
##  $ tBodyGyroJerk-std()-X      : num  -0.992 -0.99 -0.988 -0.991 -0.991 ...
##  $ tBodyGyroJerk-std()-Y      : num  -0.993 -0.997 -0.996 -0.997 -0.996 ...
##  $ tBodyGyroJerk-std()-Z      : num  -0.992 -0.994 -0.992 -0.993 -0.995 ...
##  $ tBodyAccMag-mean()         : num  -0.959 -0.979 -0.984 -0.987 -0.993 ...
##  $ tBodyAccMag-std()          : num  -0.951 -0.976 -0.988 -0.986 -0.991 ...
##  $ tGravityAccMag-mean()      : num  -0.959 -0.979 -0.984 -0.987 -0.993 ...
##  $ tGravityAccMag-std()       : num  -0.951 -0.976 -0.988 -0.986 -0.991 ...
##  $ tBodyAccJerkMag-mean()     : num  -0.993 -0.991 -0.989 -0.993 -0.993 ...
##  $ tBodyAccJerkMag-std()      : num  -0.994 -0.992 -0.99 -0.993 -0.996 ...
##  $ tBodyGyroMag-mean()        : num  -0.969 -0.981 -0.976 -0.982 -0.985 ...
##  $ tBodyGyroMag-std()         : num  -0.964 -0.984 -0.986 -0.987 -0.989 ...
##  $ tBodyGyroJerkMag-mean()    : num  -0.994 -0.995 -0.993 -0.996 -0.996 ...
##  $ tBodyGyroJerkMag-std()     : num  -0.991 -0.996 -0.995 -0.995 -0.995 ...
##  $ fBodyAcc-mean()-X          : num  -0.995 -0.997 -0.994 -0.995 -0.997 ...
##  $ fBodyAcc-mean()-Y          : num  -0.983 -0.977 -0.973 -0.984 -0.982 ...
##  $ fBodyAcc-mean()-Z          : num  -0.939 -0.974 -0.983 -0.991 -0.988 ...
##  $ fBodyAcc-std()-X           : num  -0.995 -0.999 -0.996 -0.996 -0.999 ...
##  $ fBodyAcc-std()-Y           : num  -0.983 -0.975 -0.966 -0.983 -0.98 ...
##  $ fBodyAcc-std()-Z           : num  -0.906 -0.955 -0.977 -0.99 -0.992 ...
##  $ fBodyAccJerk-mean()-X      : num  -0.992 -0.995 -0.991 -0.994 -0.996 ...
##  $ fBodyAccJerk-mean()-Y      : num  -0.987 -0.981 -0.982 -0.989 -0.989 ...
##  $ fBodyAccJerk-mean()-Z      : num  -0.99 -0.99 -0.988 -0.991 -0.991 ...
##  $ fBodyAccJerk-std()-X       : num  -0.996 -0.997 -0.991 -0.991 -0.997 ...
##  $ fBodyAccJerk-std()-Y       : num  -0.991 -0.982 -0.981 -0.987 -0.989 ...
##  $ fBodyAccJerk-std()-Z       : num  -0.997 -0.993 -0.99 -0.994 -0.993 ...
##  $ fBodyGyro-mean()-X         : num  -0.987 -0.977 -0.975 -0.987 -0.982 ...
##  $ fBodyGyro-mean()-Y         : num  -0.982 -0.993 -0.994 -0.994 -0.993 ...
##  $ fBodyGyro-mean()-Z         : num  -0.99 -0.99 -0.987 -0.987 -0.989 ...
##  $ fBodyGyro-std()-X          : num  -0.985 -0.985 -0.977 -0.993 -0.986 ...
##  $ fBodyGyro-std()-Y          : num  -0.974 -0.987 -0.993 -0.992 -0.992 ...
##  $ fBodyGyro-std()-Z          : num  -0.994 -0.99 -0.987 -0.989 -0.988 ...
##  $ fBodyAccMag-mean()         : num  -0.952 -0.981 -0.988 -0.988 -0.994 ...
```

```
##  $ fBodyAccMag-std()          : num  -0.956 -0.976 -0.989 -0.987 -0.99 ...
##  $ fBodyBodyAccJerkMag-mean() : num  -0.994 -0.99 -0.989 -0.993 -0.996 ...
##  $ fBodyBodyAccJerkMag-std()  : num  -0.994 -0.992 -0.991 -0.992 -0.994 ...
##  $ fBodyBodyGyroMag-mean()    : num  -0.98 -0.988 -0.989 -0.989 -0.991 ...
##  $ fBodyBodyGyroMag-std()     : num  -0.961 -0.983 -0.986 -0.988 -0.989 ...
##  $ fBodyBodyGyroJerkMag-mean(): num  -0.992 -0.996 -0.995 -0.995 -0.995 ...
##  $ fBodyBodyGyroJerkMag-std() : num  -0.991 -0.996 -0.995 -0.995 -0.995 ...
##  $ subject                    : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ activity                   : int  5 5 5 5 5 5 5 5 5 5 ...
```

4. Summary of data set with descriptinos from step 3 and 4

```
str(DataDesc)
```

```
## 'data.frame':    10299 obs. of  68 variables:
##  $ TimeBodyAccelerometer-mean()-X                : num  0.289 0.278 0.28 0.279 0.277 ...
##  $ TimeBodyAccelerometer-mean()-Y                : num  -0.0203 -0.0164 -0.0195 -0.0262 -0.0166 ...
##  $ TimeBodyAccelerometer-mean()-Z                : num  -0.133 -0.124 -0.113 -0.123 -0.115 ...
##  $ TimeBodyAccelerometer-std()-X                 : num  -0.995 -0.998 -0.995 -0.996 -0.998 ...
##  $ TimeBodyAccelerometer-std()-Y                 : num  -0.983 -0.975 -0.967 -0.983 -0.981 ...
##  $ TimeBodyAccelerometer-std()-Z                 : num  -0.914 -0.96 -0.979 -0.991 -0.99 ...
##  $ TimeGravityAccelerometer-mean()-X             : num  0.963 0.967 0.967 0.968 0.968 ...
##  $ TimeGravityAccelerometer-mean()-Y             : num  -0.141 -0.142 -0.142 -0.144 -0.149 ...
##  $ TimeGravityAccelerometer-mean()-Z             : num  0.1154 0.1094 0.1019 0.0999 0.0945 ...
##  $ TimeGravityAccelerometer-std()-X              : num  -0.985 -0.997 -1 -0.997 -0.998 ...
##  $ TimeGravityAccelerometer-std()-Y              : num  -0.982 -0.989 -0.993 -0.981 -0.988 ...
##  $ TimeGravityAccelerometer-std()-Z              : num  -0.878 -0.932 -0.993 -0.978 -0.979 ...
##  $ TimeBodyAccelerometerJerk-mean()-X            : num  0.078 0.074 0.0736 0.0773 0.0734 ...
##  $ TimeBodyAccelerometerJerk-mean()-Y            : num  0.005 0.00577 0.0031 0.02006 0.01912 ...
##  $ TimeBodyAccelerometerJerk-mean()-Z            : num  -0.06783 0.02938 -0.00905 -0.00986 0.01678 .
##  $ TimeBodyAccelerometerJerk-std()-X             : num  -0.994 -0.996 -0.991 -0.993 -0.996 ...
##  $ TimeBodyAccelerometerJerk-std()-Y             : num  -0.988 -0.981 -0.981 -0.988 -0.988 ...
##  $ TimeBodyAccelerometerJerk-std()-Z             : num  -0.994 -0.992 -0.99 -0.993 -0.992 ...
##  $ TimeBodyGyroscope-mean()-X                    : num  -0.0061 -0.0161 -0.0317 -0.0434 -0.034 ...
##  $ TimeBodyGyroscope-mean()-Y                    : num  -0.0314 -0.0839 -0.1023 -0.0914 -0.0747 ...
##  $ TimeBodyGyroscope-mean()-Z                    : num  0.1077 0.1006 0.0961 0.0855 0.0774 ...
##  $ TimeBodyGyroscope-std()-X                     : num  -0.985 -0.983 -0.976 -0.991 -0.985 ...
##  $ TimeBodyGyroscope-std()-Y                     : num  -0.977 -0.989 -0.994 -0.992 -0.992 ...
##  $ TimeBodyGyroscope-std()-Z                     : num  -0.992 -0.989 -0.986 -0.988 -0.987 ...
##  $ TimeBodyGyroscopeJerk-mean()-X                : num  -0.0992 -0.1105 -0.1085 -0.0912 -0.0908 ...
##  $ TimeBodyGyroscopeJerk-mean()-Y                : num  -0.0555 -0.0448 -0.0424 -0.0363 -0.0376 ...
##  $ TimeBodyGyroscopeJerk-mean()-Z                : num  -0.062 -0.0592 -0.0558 -0.0605 -0.0583 ...
##  $ TimeBodyGyroscopeJerk-std()-X                 : num  -0.992 -0.99 -0.988 -0.991 -0.991 ...
##  $ TimeBodyGyroscopeJerk-std()-Y                 : num  -0.993 -0.997 -0.996 -0.997 -0.996 ...
##  $ TimeBodyGyroscopeJerk-std()-Z                 : num  -0.992 -0.994 -0.992 -0.993 -0.995 ...
##  $ TimeBodyAccelerometerMagnitude-mean()         : num  -0.959 -0.979 -0.984 -0.987 -0.993 ...
##  $ TimeBodyAccelerometerMagnitude-std()          : num  -0.951 -0.976 -0.988 -0.986 -0.991 ...
##  $ TimeGravityAccelerometerMagnitude-mean()      : num  -0.959 -0.979 -0.984 -0.987 -0.993 ...
##  $ TimeGravityAccelerometerMagnitude-std()       : num  -0.951 -0.976 -0.988 -0.986 -0.991 ...
##  $ TimeBodyAccelerometerJerkMagnitude-mean()     : num  -0.993 -0.991 -0.989 -0.993 -0.993 ...
##  $ TimeBodyAccelerometerJerkMagnitude-std()      : num  -0.994 -0.992 -0.99 -0.993 -0.996 ...
##  $ TimeBodyGyroscopeMagnitude-mean()             : num  -0.969 -0.981 -0.976 -0.982 -0.985 ...
```

```
##  $ TimeBodyGyroscopeMagnitude-std()              : num  -0.964 -0.984 -0.986 -0.987 -0.989 ...
##  $ TimeBodyGyroscopeJerkMagnitude-mean()         : num  -0.994 -0.995 -0.993 -0.996 -0.996 ...
##  $ TimeBodyGyroscopeJerkMagnitude-std()          : num  -0.991 -0.996 -0.995 -0.995 -0.995 ...
##  $ FrequencyBodyAccelerometer-mean()-X           : num  -0.995 -0.997 -0.994 -0.995 -0.997 ...
##  $ FrequencyBodyAccelerometer-mean()-Y           : num  -0.983 -0.977 -0.973 -0.984 -0.982 ...
##  $ FrequencyBodyAccelerometer-mean()-Z           : num  -0.939 -0.974 -0.983 -0.991 -0.988 ...
##  $ FrequencyBodyAccelerometer-std()-X            : num  -0.995 -0.999 -0.996 -0.996 -0.999 ...
##  $ FrequencyBodyAccelerometer-std()-Y            : num  -0.983 -0.975 -0.966 -0.983 -0.98 ...
##  $ FrequencyBodyAccelerometer-std()-Z            : num  -0.906 -0.955 -0.977 -0.99 -0.992 ...
##  $ FrequencyBodyAccelerometerJerk-mean()-X       : num  -0.992 -0.995 -0.991 -0.994 -0.996 ...
##  $ FrequencyBodyAccelerometerJerk-mean()-Y       : num  -0.987 -0.981 -0.982 -0.989 -0.989 ...
##  $ FrequencyBodyAccelerometerJerk-mean()-Z       : num  -0.99 -0.99 -0.988 -0.991 -0.991 ...
##  $ FrequencyBodyAccelerometerJerk-std()-X        : num  -0.996 -0.997 -0.991 -0.991 -0.997 ...
##  $ FrequencyBodyAccelerometerJerk-std()-Y        : num  -0.991 -0.982 -0.981 -0.987 -0.989 ...
##  $ FrequencyBodyAccelerometerJerk-std()-Z        : num  -0.997 -0.993 -0.99 -0.994 -0.993 ...
##  $ FrequencyBodyGyroscope-mean()-X               : num  -0.987 -0.977 -0.975 -0.987 -0.982 ...
##  $ FrequencyBodyGyroscope-mean()-Y               : num  -0.982 -0.993 -0.994 -0.994 -0.993 ...
##  $ FrequencyBodyGyroscope-mean()-Z               : num  -0.99 -0.99 -0.987 -0.987 -0.989 ...
##  $ FrequencyBodyGyroscope-std()-X                : num  -0.985 -0.985 -0.977 -0.993 -0.986 ...
##  $ FrequencyBodyGyroscope-std()-Y                : num  -0.974 -0.987 -0.993 -0.992 -0.992 ...
##  $ FrequencyBodyGyroscope-std()-Z                : num  -0.994 -0.99 -0.987 -0.989 -0.988 ...
##  $ FrequencyBodyAccelerometerMagnitude-mean()    : num  -0.952 -0.981 -0.988 -0.988 -0.994 ...
##  $ FrequencyBodyAccelerometerMagnitude-std()     : num  -0.956 -0.976 -0.989 -0.987 -0.99 ...
##  $ FrequencyBodyAccelerometerJerkMagnitude-mean(): num  -0.994 -0.99 -0.989 -0.993 -0.996 ...
##  $ FrequencyBodyAccelerometerJerkMagnitude-std() : num  -0.994 -0.992 -0.991 -0.992 -0.994 ...
##  $ FrequencyBodyGyroscopeMagnitude-mean()        : num  -0.98 -0.988 -0.989 -0.989 -0.991 ...
##  $ FrequencyBodyGyroscopeMagnitude-std()         : num  -0.961 -0.983 -0.986 -0.988 -0.989 ...
##  $ FrequencyBodyGyroscopeJerkMagnitude-mean()    : num  -0.992 -0.996 -0.995 -0.995 -0.995 ...
##  $ FrequencyBodyGyroscopeJerkMagnitude-std()     : num  -0.991 -0.996 -0.995 -0.995 -0.995 ...
##  $ subject                                       : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ activity                                      : Factor w/ 6 levels "WALKING","WALKING_UPSTAIRS",.
```

5. Summary of data set generated in step 5

```
str(D2)
```

```
## 'data.frame':    180 obs. of  68 variables:
##  $ activities                                    : Factor w/ 6 levels "WALKING","WALKING_UPSTAIRS",.
##  $ TimeBodyAccelerometer-mean()-X                : num  0.277 0.255 0.289 0.261 0.279 ...
##  $ TimeBodyAccelerometer-mean()-Y                : num  -0.01738 -0.02395 -0.00992 -0.00131 -0.01614
##  $ TimeBodyAccelerometer-mean()-Z                : num  -0.1111 -0.0973 -0.1076 -0.1045 -0.1106 ...
##  $ TimeBodyAccelerometer-std()-X                 : num  -0.284 -0.355 0.03 -0.977 -0.996 ...
##  $ TimeBodyAccelerometer-std()-Y                 : num  0.11446 -0.00232 -0.03194 -0.92262 -0.97319
##  $ TimeBodyAccelerometer-std()-Z                 : num  -0.26 -0.0195 -0.2304 -0.9396 -0.9798 ...
##  $ TimeGravityAccelerometer-mean()-X             : num  0.935 0.893 0.932 0.832 0.943 ...
##  $ TimeGravityAccelerometer-mean()-Y             : num  -0.282 -0.362 -0.267 0.204 -0.273 ...
##  $ TimeGravityAccelerometer-mean()-Z             : num  -0.0681 -0.0754 -0.0621 0.332 0.0135 ...
##  $ TimeGravityAccelerometer-std()-X              : num  -0.977 -0.956 -0.951 -0.968 -0.994 ...
##  $ TimeGravityAccelerometer-std()-Y              : num  -0.971 -0.953 -0.937 -0.936 -0.981 ...
##  $ TimeGravityAccelerometer-std()-Z              : num  -0.948 -0.912 -0.896 -0.949 -0.976 ...
##  $ TimeBodyAccelerometerJerk-mean()-X            : num  0.074 0.1014 0.0542 0.0775 0.0754 ...
##  $ TimeBodyAccelerometerJerk-mean()-Y            : num  0.028272 0.019486 0.02965 -0.000619 0.007976
```

```
##  $ TimeBodyAccelerometerJerk-mean()-Z           : num  -0.00417 -0.04556 -0.01097 -0.00337 -0.00369
##  $ TimeBodyAccelerometerJerk-std()-X            : num  -0.1136 -0.4468 -0.0123 -0.9864 -0.9946 ...
##  $ TimeBodyAccelerometerJerk-std()-Y            : num  0.067 -0.378 -0.102 -0.981 -0.986 ...
##  $ TimeBodyAccelerometerJerk-std()-Z            : num  -0.503 -0.707 -0.346 -0.988 -0.992 ...
##  $ TimeBodyGyroscope-mean()-X                   : num  -0.0418 0.0505 -0.0351 -0.0454 -0.024 ...
##  $ TimeBodyGyroscope-mean()-Y                   : num  -0.0695 -0.1662 -0.0909 -0.0919 -0.0594 ...
##  $ TimeBodyGyroscope-mean()-Z                   : num  0.0849 0.0584 0.0901 0.0629 0.0748 ...
##  $ TimeBodyGyroscope-std()-X                    : num  -0.474 -0.545 -0.458 -0.977 -0.987 ...
##  $ TimeBodyGyroscope-std()-Y                    : num  -0.05461 0.00411 -0.12635 -0.96647 -0.98773
##  $ TimeBodyGyroscope-std()-Z                    : num  -0.344 -0.507 -0.125 -0.941 -0.981 ...
##  $ TimeBodyGyroscopeJerk-mean()-X               : num  -0.09 -0.1222 -0.074 -0.0937 -0.0996 ...
##  $ TimeBodyGyroscopeJerk-mean()-Y               : num  -0.0398 -0.0421 -0.044 -0.0402 -0.0441 ...
##  $ TimeBodyGyroscopeJerk-mean()-Z               : num  -0.0461 -0.0407 -0.027 -0.0467 -0.049 ...
##  $ TimeBodyGyroscopeJerk-std()-X                : num  -0.207 -0.615 -0.487 -0.992 -0.993 ...
##  $ TimeBodyGyroscopeJerk-std()-Y                : num  -0.304 -0.602 -0.239 -0.99 -0.995 ...
##  $ TimeBodyGyroscopeJerk-std()-Z                : num  -0.404 -0.606 -0.269 -0.988 -0.992 ...
##  $ TimeBodyAccelerometerMagnitude-mean()        : num  -0.137 -0.1299 0.0272 -0.9485 -0.9843 ...
##  $ TimeBodyAccelerometerMagnitude-std()         : num  -0.2197 -0.325 0.0199 -0.9271 -0.9819 ...
##  $ TimeGravityAccelerometerMagnitude-mean()     : num  -0.137 -0.1299 0.0272 -0.9485 -0.9843 ...
##  $ TimeGravityAccelerometerMagnitude-std()      : num  -0.2197 -0.325 0.0199 -0.9271 -0.9819 ...
##  $ TimeBodyAccelerometerJerkMagnitude-mean()    : num  -0.1414 -0.4665 -0.0894 -0.9874 -0.9924 ...
##  $ TimeBodyAccelerometerJerkMagnitude-std()     : num  -0.0745 -0.479 -0.0258 -0.9841 -0.9931 ...
##  $ TimeBodyGyroscopeMagnitude-mean()            : num  -0.161 -0.1267 -0.0757 -0.9309 -0.9765 ...
##  $ TimeBodyGyroscopeMagnitude-std()             : num  -0.187 -0.149 -0.226 -0.935 -0.979 ...
##  $ TimeBodyGyroscopeJerkMagnitude-mean()        : num  -0.299 -0.595 -0.295 -0.992 -0.995 ...
##  $ TimeBodyGyroscopeJerkMagnitude-std()         : num  -0.325 -0.649 -0.307 -0.988 -0.995 ...
##  $ FrequencyBodyAccelerometer-mean()-X          : num  -0.2028 -0.4043 0.0382 -0.9796 -0.9952 ...
##  $ FrequencyBodyAccelerometer-mean()-Y          : num  0.08971 -0.19098 0.00155 -0.94408 -0.97707 .
##  $ FrequencyBodyAccelerometer-mean()-Z          : num  -0.332 -0.433 -0.226 -0.959 -0.985 ...
##  $ FrequencyBodyAccelerometer-std()-X           : num  -0.3191 -0.3374 0.0243 -0.9764 -0.996 ...
##  $ FrequencyBodyAccelerometer-std()-Y           : num  0.056 0.0218 -0.113 -0.9173 -0.9723 ...
##  $ FrequencyBodyAccelerometer-std()-Z           : num  -0.28 0.086 -0.298 -0.934 -0.978 ...
##  $ FrequencyBodyAccelerometerJerk-mean()-X      : num  -0.1705 -0.4799 -0.0277 -0.9866 -0.9946 ...
##  $ FrequencyBodyAccelerometerJerk-mean()-Y      : num  -0.0352 -0.4134 -0.1287 -0.9816 -0.9854 ...
##  $ FrequencyBodyAccelerometerJerk-mean()-Z      : num  -0.469 -0.685 -0.288 -0.986 -0.991 ...
##  $ FrequencyBodyAccelerometerJerk-std()-X       : num  -0.1336 -0.4619 -0.0863 -0.9875 -0.9951 ...
##  $ FrequencyBodyAccelerometerJerk-std()-Y       : num  0.107 -0.382 -0.135 -0.983 -0.987 ...
##  $ FrequencyBodyAccelerometerJerk-std()-Z       : num  -0.535 -0.726 -0.402 -0.988 -0.992 ...
##  $ FrequencyBodyGyroscope-mean()-X              : num  -0.339 -0.493 -0.352 -0.976 -0.986 ...
##  $ FrequencyBodyGyroscope-mean()-Y              : num  -0.1031 -0.3195 -0.0557 -0.9758 -0.989 ...
##  $ FrequencyBodyGyroscope-mean()-Z              : num  -0.2559 -0.4536 -0.0319 -0.9513 -0.9808 ...
##  $ FrequencyBodyGyroscope-std()-X               : num  -0.517 -0.566 -0.495 -0.978 -0.987 ...
##  $ FrequencyBodyGyroscope-std()-Y               : num  -0.0335 0.1515 -0.1814 -0.9623 -0.9871 ...
##  $ FrequencyBodyGyroscope-std()-Z               : num  -0.437 -0.572 -0.238 -0.944 -0.982 ...
##  $ FrequencyBodyAccelerometerMagnitude-mean()   : num  -0.1286 -0.3524 0.0966 -0.9478 -0.9854 ...
##  $ FrequencyBodyAccelerometerMagnitude-std()    : num  -0.398 -0.416 -0.187 -0.928 -0.982 ...
##  $ FrequencyBodyAccelerometerJerkMagnitude-mean(): num  -0.0571 -0.4427 0.0262 -0.9853 -0.9925 ...
##  $ FrequencyBodyAccelerometerJerkMagnitude-std() : num  -0.103 -0.533 -0.104 -0.982 -0.993 ...
##  $ FrequencyBodyGyroscopeMagnitude-mean()       : num  -0.199 -0.326 -0.186 -0.958 -0.985 ...
##  $ FrequencyBodyGyroscopeMagnitude-std()        : num  -0.321 -0.183 -0.398 -0.932 -0.978 ...
##  $ FrequencyBodyGyroscopeJerkMagnitude-mean()   : num  -0.319 -0.635 -0.282 -0.99 -0.995 ...
##  $ FrequencyBodyGyroscopeJerkMagnitude-std()    : num  -0.382 -0.694 -0.392 -0.987 -0.995 ...
##  $ subject                                      : num  1 1 1 1 1 1 2 2 2 2 ...
```