Code book for *Getting and Cleaning Data - Peer Graded Assignment*

See the README.md file of this repository for background information on this data set.

The structure of the data set is described in the Data section, its variables are listed in the Variables section, and the transformations that were carried out to obtain the data set based on the source data are presented in the Transformations section.

Data
The tidy_data.txt data file is a text file, containing space-separated values.

The first row contains the names of the variables, which are listed and described in the Variables section, and the following rows contain the values of these variables.

Variables
Each row contains, for a given subject and activity, 79 averaged signal measurements.

Identifiers
subject

Subject identifier, integer, ranges from 1 to 30.

activity

Activity identifier, string with 6 possible values:

WALKING: subject was walking
WALKING_UPSTAIRS: subject was walking upstairs
WALKING_DOWNSTAIRS: subject was walking downstairs
SITTING: subject was sitting
STANDING: subject was standing
LAYING: subject was laying
Average of measurements
All measurements are floating-point values, normalised and bounded within [-1,1].

Prior to normalisation, acceleration measurements (variables containing Accelerometer) were made in g's (9.81 $m.s^{-2}$) and gyroscope measurements (variables containing Gyroscope) were made in radians per second ($rad.s^{-1}$).

Magnitudes of three-dimensional signals (variables containing Magnitude) were calculated using the Euclidean norm.

The measurements are classified in two domains:

Time-domain signals (variables prefixed by timeDomain), resulting from the capture of accelerometer and gyroscope raw signals.

Frequency-domain signals (variables prefixed by frequencyDomain), resulting from the application of a Fast Fourier Transform (FFT) to some of the time-domain signals.

Time-domain signals
Average time-domain body acceleration in the X, Y and Z directions:

timeDomainBodyAccelerometerMeanX
timeDomainBodyAccelerometerMeanY
timeDomainBodyAccelerometerMeanZ
Standard deviation of the time-domain body acceleration in the X, Y and Z directions:

timeDomainBodyAccelerometerStandardDeviationX
timeDomainBodyAccelerometerStandardDeviationY
timeDomainBodyAccelerometerStandardDeviationZ
Average time-domain gravity acceleration in the X, Y and Z directions:

timeDomainGravityAccelerometerMeanX
timeDomainGravityAccelerometerMeanY
timeDomainGravityAccelerometerMeanZ
Standard deviation of the time-domain gravity acceleration in the X, Y and Z directions:

timeDomainGravityAccelerometerStandardDeviationX
timeDomainGravityAccelerometerStandardDeviationY
timeDomainGravityAccelerometerStandardDeviationZ
Average time-domain body acceleration jerk (derivation of the acceleration in time) in the X, Y and Z directions:

timeDomainBodyAccelerometerJerkMeanX
timeDomainBodyAccelerometerJerkMeanY
timeDomainBodyAccelerometerJerkMeanZ
Standard deviation of the time-domain body acceleration jerk (derivation of the acceleration in time) in the X, Y and Z directions:

timeDomainBodyAccelerometerJerkStandardDeviationX
timeDomainBodyAccelerometerJerkStandardDeviationY
timeDomainBodyAccelerometerJerkStandardDeviationZ
Average time-domain body angular velocity in the X, Y and Z directions:

timeDomainBodyGyroscopeMeanX
timeDomainBodyGyroscopeMeanY
timeDomainBodyGyroscopeMeanZ
Standard deviation of the time-domain body angular velocity in the X, Y and Z directions:

timeDomainBodyGyroscopeStandardDeviationX
timeDomainBodyGyroscopeStandardDeviationY
timeDomainBodyGyroscopeStandardDeviationZ
Average time-domain body angular velocity jerk (derivation of the angular velocity in time) in the X, Y and Z directions:

timeDomainBodyGyroscopeJerkMeanX
timeDomainBodyGyroscopeJerkMeanY
timeDomainBodyGyroscopeJerkMeanZ
Standard deviation of the time-domain body angular velocity jerk (derivation of the angular velocity in time) in the X, Y and Z directions:

timeDomainBodyGyroscopeJerkStandardDeviationX
timeDomainBodyGyroscopeJerkStandardDeviationY
timeDomainBodyGyroscopeJerkStandardDeviationZ
Average and standard deviation of the time-domain magnitude of body acceleration:

timeDomainBodyAccelerometerMagnitudeMean
timeDomainBodyAccelerometerMagnitudeStandardDeviation
Average and standard deviation of the time-domain magnitude of gravity acceleration:

timeDomainGravityAccelerometerMagnitudeMean
timeDomainGravityAccelerometerMagnitudeStandardDeviation
Average and standard deviation of the time-domain magnitude of body acceleration jerk (derivation of the acceleration in time):

timeDomainBodyAccelerometerJerkMagnitudeMean
timeDomainBodyAccelerometerJerkMagnitudeStandardDeviation
Average and standard deviation of the time-domain magnitude of body angular velocity:

timeDomainBodyGyroscopeMagnitudeMean
timeDomainBodyGyroscopeMagnitudeStandardDeviation
Average and standard deviation of the time-domain magnitude of body angular velocity jerk (derivation of the angular velocity in time):

timeDomainBodyGyroscopeJerkMagnitudeMean
timeDomainBodyGyroscopeJerkMagnitudeStandardDeviation
Frequency-domain signals
Average frequency-domain body acceleration in the X, Y and Z directions:

frequencyDomainBodyAccelerometerMeanX
frequencyDomainBodyAccelerometerMeanY
frequencyDomainBodyAccelerometerMeanZ
Standard deviation of the frequency-domain body acceleration in the X, Y and Z directions:

frequencyDomainBodyAccelerometerStandardDeviationX
frequencyDomainBodyAccelerometerStandardDeviationY
frequencyDomainBodyAccelerometerStandardDeviationZ
Weighted average of the frequency components of the frequency-domain body acceleration in the X, Y and Z directions:

frequencyDomainBodyAccelerometerMeanFrequencyX
frequencyDomainBodyAccelerometerMeanFrequencyY
frequencyDomainBodyAccelerometerMeanFrequencyZ
Average frequency-domain body acceleration jerk (derivation of the acceleration in time) in the X, Y and Z directions:

frequencyDomainBodyAccelerometerJerkMeanX
frequencyDomainBodyAccelerometerJerkMeanY
frequencyDomainBodyAccelerometerJerkMeanZ
Standard deviation of the frequency-domain body acceleration jerk (derivation of the acceleration in time) in the X, Y and Z directions:

frequencyDomainBodyAccelerometerJerkStandardDeviationX
frequencyDomainBodyAccelerometerJerkStandardDeviationY
frequencyDomainBodyAccelerometerJerkStandardDeviationZ
Weighted average of the frequency components of the frequency-domain body acceleration jerk (derivation of the acceleration in time) in the X, Y and Z directions:

frequencyDomainBodyAccelerometerJerkMeanFrequencyX
frequencyDomainBodyAccelerometerJerkMeanFrequencyY
frequencyDomainBodyAccelerometerJerkMeanFrequencyZ
Average frequency-domain body angular velocity in the X, Y and Z directions:

frequencyDomainBodyGyroscopeMeanX
frequencyDomainBodyGyroscopeMeanY
frequencyDomainBodyGyroscopeMeanZ
Standard deviation of the frequency-domain body angular velocity in the X, Y and Z directions:

frequencyDomainBodyGyroscopeStandardDeviationX
frequencyDomainBodyGyroscopeStandardDeviationY
frequencyDomainBodyGyroscopeStandardDeviationZ
Weighted average of the frequency components of the frequency-domain body angular velocity in the X, Y and Z directions:

frequencyDomainBodyGyroscopeMeanFrequencyX
frequencyDomainBodyGyroscopeMeanFrequencyY
frequencyDomainBodyGyroscopeMeanFrequencyZ
Average, standard deviation, and weighted average of the frequency components of the frequency-domain magnitude of body acceleration:

frequencyDomainBodyAccelerometerMagnitudeMean
frequencyDomainBodyAccelerometerMagnitudeStandardDeviation
frequencyDomainBodyAccelerometerMagnitudeMeanFrequency
Average, standard deviation, and weighted average of the frequency components of the frequency-domain magnitude of body acceleration jerk (derivation of the acceleration in time):

frequencyDomainBodyAccelerometerJerkMagnitudeMean
frequencyDomainBodyAccelerometerJerkMagnitudeStandardDeviation
frequencyDomainBodyAccelerometerJerkMagnitudeMeanFrequency
Average, standard deviation, and weighted average of the frequency components of the frequency-domain magnitude of body angular velocity:

frequencyDomainBodyGyroscopeMagnitudeMean
frequencyDomainBodyGyroscopeMagnitudeStandardDeviation
frequencyDomainBodyGyroscopeMagnitudeMeanFrequency
Average, standard deviation, and weighted average of the frequency components of the frequency-domain magnitude of body angular velocity jerk (derivation of the angular velocity in time):

frequencyDomainBodyGyroscopeJerkMagnitudeMean
frequencyDomainBodyGyroscopeJerkMagnitudeStandardDeviation
frequencyDomainBodyGyroscopeJerkMagnitudeMeanFrequency
Transformations
The zip file containing the source data is located at https://d396qusza40orc.cloudfront.net/getdata%2Fprojectfiles%2FUCI%20HAR%20Dataset.zip.

The following transformations were applied to the source data:

The training and test sets were merged to create one data set.
The measurements on the mean and standard deviation (i.e. signals containing the strings mean and std) were extracted for each measurement, and the others were discarded.
The activity identifiers (originally coded as integers between 1 and 6) were replaced with descriptive activity names (see Identifiers section).
The variable names were replaced with descriptive variable names (e.g. tBodyAcc-mean()-X was expanded to timeDomainBodyAccelerometerMeanX), using the following set of rules:
Special characters (i.e. (,), and -) were removed
The initial f and t were expanded to frequencyDomain and timeDomain respectively.
Acc, Gyro, Mag, Freq, mean, and std were replaced with Accelerometer, Gyroscope, Magnitude, Frequency, Mean, and StandardDeviation respectively.
Replaced (supposedly incorrect as per source's features_info.txt file) BodyBody with Body.
From the data set in step 4, the final data set was created with the average of each variable for each activity and each subject.
The collection of the source data and the transformations listed above were implemented by the run_analysis.R R script (see README.md file for usage instructions).