CODEBOOK

“subject”
[numeric] Ranges from 1 to 30
It represents the subject who performed the activity in the experiment

“activity”
[character] Has 6 labels: WALKING, WALKING_UPSTAIRS, WALKING_DOWNSTAIRS, SITTING, STANDING, LAYING
It represents the activity performed by the subject in the experiment

"tBodyAcc-mean()-X"
"tBodyAcc-mean()-Y"
"tBodyAcc-mean()-Z"
"tBodyAcc-std()-X"
"tBodyAcc-std()-Y"
"tBodyAcc-std()-Z"
"tGravityAcc-mean()-X"
"tGravityAcc-mean()-Y"
"tGravityAcc-mean()-Z"
"tGravityAcc-std()-X"
"tGravityAcc-std()-Y"
"tGravityAcc-std()-Z"
"tBodyAccJerk-mean()-X"
"tBodyAccJerk-mean()-Y"
"tBodyAccJerk-mean()-Z"
"tBodyAccJerk-std()-X"
"tBodyAccJerk-std()-Y"
"tBodyAccJerk-std()-Z"
"tBodyGyro-mean()-X"
"tBodyGyro-mean()-Y"
"tBodyGyro-mean()-Z"
"tBodyGyro-std()-X"
"tBodyGyro-std()-Y"
"tBodyGyro-std()-Z"
"tBodyGyroJerk-mean()-X"
"tBodyGyroJerk-mean()-Y"
"tBodyGyroJerk-mean()-Z"
"tBodyGyroJerk-std()-X"
"tBodyGyroJerk-std()-Y"
"tBodyGyroJerk-std()-Z"
"tBodyAccMag-mean()"
"tBodyAccMag-std()"
"tGravityAccMag-mean()"
"tGravityAccMag-std()"
"tBodyAccJerkMag-mean()"
"tBodyAccJerkMag-std()"

"tBodyGyroMag-mean()"
"tBodyGyroMag-std()"
"tBodyGyroJerkMag-mean()"
"tBodyGyroJerkMag-std()"
"fBodyAcc-mean()-X"
"fBodyAcc-mean()-Y"
"fBodyAcc-mean()-Z"
"fBodyAcc-std()-X"
"fBodyAcc-std()-Y"
"fBodyAcc-std()-Z"
"fBodyAcc-meanFreq()-X"
"fBodyAcc-meanFreq()-Y"
"fBodyAcc-meanFreq()-Z"
"fBodyAccJerk-mean()-X"
"fBodyAccJerk-mean()-Y"
"fBodyAccJerk-mean()-Z"
"fBodyAccJerk-std()-X"
"fBodyAccJerk-std()-Y"
"fBodyAccJerk-std()-Z"
"fBodyAccJerk-meanFreq()-X"
"fBodyAccJerk-meanFreq()-Y"
"fBodyAccJerk-meanFreq()-Z"
"fBodyGyro-mean()-X"
"fBodyGyro-mean()-Y"
"fBodyGyro-mean()-Z"
"fBodyGyro-std()-X"
"fBodyGyro-std()-Y"
"fBodyGyro-std()-Z"
"fBodyGyro-meanFreq()-X"
"fBodyGyro-meanFreq()-Y"
"fBodyGyro-meanFreq()-Z"
"fBodyAccMag-mean()"
"fBodyAccMag-std()"
"fBodyAccMag-meanFreq()"
"fBodyBodyAccJerkMag-mean()"
"fBodyBodyAccJerkMag-std()"
"fBodyBodyAccJerkMag-meanFreq()"
"fBodyBodyGyroMag-mean()"
"fBodyBodyGyroMag-std()"
"fBodyBodyGyroMag-meanFreq()"
"fBodyBodyGyroJerkMag-mean()"
"fBodyBodyGyroJerkMag-std()"
"fBodyBodyGyroJerkMag-meanFreq()"
[numeric] A list of 79 mean values of variables that are normalized and bounded within [-1,1] They represent the average value of either means or standard deviations of a series of measurements from the accelerometer and gyroscope, calculated for each present combination of subject and activity in the study.

NOTES:
The following information is a copy of the original description of the variables, available on the feature_info.txt file from the original publication of the data at the UCI Machine Learning Repository:
http://archive.ics.uci.edu/ml/datasets/Human+Activity+Recognition+Using+Smartphones

Feature Selection
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The features selected for this database come from the accelerometer and gyroscope 3-axial raw signals tAcc-XYZ and tGyro-XYZ. These time domain signals (prefix 't' to denote time) were captured at a constant rate of 50 Hz. Then they were filtered using a median filter and a 3rd order low pass Butterworth filter with a corner frequency of 20 Hz to remove noise. Similarly, the acceleration signal was then separated into body and gravity acceleration signals (tBodyAcc-XYZ and tGravityAcc-XYZ) using another low pass Butterworth filter with a corner frequency of 0.3 Hz.

Subsequently, the body linear acceleration and angular velocity were derived in time to obtain Jerk signals (tBodyAccJerk-XYZ and tBodyGyroJerk-XYZ). Also the magnitude of these three-dimensional signals were calculated using the Euclidean norm (tBodyAccMag, tGravityAccMag, tBodyAccJerkMag, tBodyGyroMag, tBodyGyroJerkMag).

Finally a Fast Fourier Transform (FFT) was applied to some of these signals producing fBodyAcc-XYZ, fBodyAccJerk-XYZ, fBodyGyro-XYZ, fBodyAccJerkMag, fBodyGyroMag, fBodyGyroJerkMag. (Note the 'f' to indicate frequency domain signals).

These signals were used to estimate variables of the feature vector for each pattern:
'-XYZ' is used to denote 3-axial signals in the X, Y and Z directions.

tBodyAcc-XYZ
tGravityAcc-XYZ
tBodyAccJerk-XYZ
tBodyGyro-XYZ
tBodyGyroJerk-XYZ
tBodyAccMag
tGravityAccMag
tBodyAccJerkMag
tBodyGyroMag
tBodyGyroJerkMag
fBodyAcc-XYZ
fBodyAccJerk-XYZ
fBodyGyro-XYZ
fBodyAccMag
fBodyAccJerkMag
fBodyGyroMag
fBodyGyroJerkMag

The set of variables that were estimated from these signals are:

mean(): Mean value
std(): Standard deviation
mad(): Median absolute deviation
max(): Largest value in array
min(): Smallest value in array
sma(): Signal magnitude area
energy(): Energy measure. Sum of the squares divided by the number of values.
iqr(): Interquartile range
entropy(): Signal entropy
arCoeff(): Autorregresion coefficients with Burg order equal to 4
correlation(): correlation coefficient between two signals
maxInds(): index of the frequency component with largest magnitude
meanFreq(): Weighted average of the frequency components to obtain a mean frequency
skewness(): skewness of the frequency domain signal
kurtosis(): kurtosis of the frequency domain signal
bandsEnergy(): Energy of a frequency interval within the 64 bins of the FFT of each window.
angle(): Angle between to vectors.

Additional vectors obtained by averaging the signals in a signal window sample. These are used on the angle() variable:

gravityMean
tBodyAccMean
tBodyAccJerkMean
tBodyGyroMean
tBodyGyroJerkMean

The complete list of variables of each feature vector is available in 'features.txt'