**Study:** Human Activity Recognition Using Smartphones Dataset

Getting and Cleaning Data course - getdata-008 - course project

**Codebook:**

1. *Subjects:* Identification of the subject with range 1-30
2. *Sample:* Show if the subject was selected for the test or train group
3. *Activity:* Represent the activity during which the measures were made (WALKING, WALKING\_UPSTAIRS, WALKING\_DOWNSTAIRS, SITTING, STANDING, LAYING)
4. *Body Acceleration x mean:* Mean value of the body acceleration signal obtained by subtracting the gravity from the total acceleration measure from the Smartphone accelerometer X axis in standard gravity units 'g'.
5. *Body Acceleration x deviation:* Mean value of the standard deviation for the value of the body acceleration signal obtained by subtracting the gravity from the total acceleration measure from the Smartphone accelerometer X axis in standard gravity units 'g'.
6. *Body Acceleration y mean:* Mean value of the body acceleration signal obtained by subtracting the gravity from the total acceleration measure from the Smartphone accelerometer Y axis in standard gravity units 'g'.
7. *Body Acceleration y deviation:* Mean value of the standard deviation for the value of the body acceleration signal obtained by subtracting the gravity from the total acceleration measure from the Smartphone accelerometer Y axis in standard gravity units 'g'.
8. *Body Acceleration z mean:* Mean value of the body acceleration signal obtained by subtracting the gravity from the total acceleration measure from the Smartphone accelerometer Z axis in standard gravity units 'g'.
9. *Body Acceleration z deviation:* Mean value of the standard deviation for the value of the body acceleration signal obtained by subtracting the gravity from the total acceleration measure from the Smartphone accelerometer Z axis in standard gravity units 'g'.
10. *Angular Velocity x mean:* The mean value for the angular velocity vector X dimension measured by the gyroscope for each window sample. The units are radians/second.
11. *Angular Velocity x deviation:* Mean value of the standard deviation for value of the angular velocity vector X dimension measured by the gyroscope for each window sample. The units are radians/second.
12. *Angular Velocity y mean:* The mean value for the angular velocity vector Y dimension measured by the gyroscope for each window sample. The units are radians/second.
13. *Angular Velocity y deviation:* Mean value of the standard deviation for value of the angular velocity vector Y dimension measured by the gyroscope for each window sample. The units are radians/second.
14. *Angular Velocity z mean:* The mean value for the angular velocity vector Z dimension measured by the gyroscope for each window sample. The units are radians/second.
15. *Angular Velocity z deviation:* Mean value of the standard deviation for value of the angular velocity vector Z dimension measured by the gyroscope for each window sample. The units are radians/second.
16. *Total Acceleration x mean:* Mean value of the measured acceleration signal from the Smartphone accelerometer X axis in standard gravity units 'g'.
17. *Total Acceleration x deviation:* Mean value of the standard deviation for the measured acceleration signal from the Smartphone accelerometer X axis in standard gravity units 'g'.
18. *Total Acceleration y mean:* Mean value of the measured acceleration signal from the Smartphone accelerometer Y axis in standard gravity units 'g'.
19. *Total Acceleration y deviation:* Mean value of the standard deviation for the measured acceleration signal from the Smartphone accelerometer Y axis in standard gravity units 'g'.
20. *Total Acceleration z mean:* Mean value of the measured acceleration signal from the Smartphone accelerometer Z axis in standard gravity units 'g'.
21. *Total Acceleration z deviation:* Mean value of the standard deviation for the measured acceleration signal from the Smartphone accelerometer Z axis in standard gravity units 'g'.

**Study design:**

Data was obtained from <https://d396qusza40orc.cloudfront.net/getdata%2Fprojectfiles%2FUCI%20HAR%20Dataset.zip>

The dataset represents an experiment carried out with a group of 30 volunteers within an age bracket of 19-48 years. Each person performed six activities (WALKING, WALKING\_UPSTAIRS, WALKING\_DOWNSTAIRS, SITTING, STANDING, LAYING) wearing a smartphone (Samsung Galaxy S II) on the waist. Using its embedded accelerometer and gyroscope, 3-axial linear acceleration and 3-axial angular velocity was captured at a constant rate of 50Hz. The experiment was video-recorded to label the data manually. The obtained dataset was randomly partitioned into two sets, where 70% of the volunteers were selected for generating the training data and 30% the test data.

The sensor signals (accelerometer and gyroscope) were pre-processed by applying noise filters and then sampled in fixed-width sliding windows of 2.56 sec and 50% overlap (128 readings/window). The sensor acceleration signal, which has gravitational and body motion components, was separated using a Butterworth low-pass filter into body acceleration and gravity. The gravitational force is assumed to have only low frequency components; therefore a filter with 0.3 Hz cut-off frequency was used. From each window, a vector of features was obtained by calculating variables from the time and frequency domain

The values for the training set 'train/X\_train.txt' and test set 'test/X\_test.txt' were removed by the end of the analysis as information such as units and acquisition method were missing.