**Codebook**

**Data Set Information**

The experiments have been 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, we captured 3-axial linear acceleration and 3-axial angular velocity at a constant rate of 50Hz. The experiments have been video-recorded to label the data manually. The obtained dataset has been randomly partitioned into two sets, where 70% of the volunteers was 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 cutoff frequency was used. From each window, a vector of features was obtained by calculating variables from the time and frequency domain.

**Attribute Information**

For each record in the dataset it is provided:

* Triaxial acceleration from the accelerometer (total acceleration) and the estimated body acceleration.
* Triaxial Angular velocity from the gyroscope.
* Its activity label.

**Citation Request**

[1] Davide Anguita, Alessandro Ghio, Luca Oneto, Xavier Parra and Jorge L. Reyes-Ortiz. Human Activity Recognition on Smartphones using a Multiclass Hardware-Friendly Support Vector Machine. International Workshop of Ambient Assisted Living (IWAAL 2012). Vitoria-Gasteiz, Spain. Dec 2012

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

**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 |
| 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 |