

ReadMe for ‘Human Activity Recognition Using Smartphones Dataset’

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Human Activity Recognition Using Smartphones Dataset Version 1.0

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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. See ‘features_info.txt’ for more details.

For each record it is provided:

- Triaxial acceleration from the accelerometer (total acceleration) and the estimated body acceleration.
- Triaxial Angular velocity from the gyroscope.
- A 561-feature vector with time and frequency domain variables.
- Its activity label.
- An identifier of the subject who carried out the experiment.

The dataset includes the following files:

- ‘ReadMe.RMD’
- ‘ReadMe.pdf’: PDF of the ReadMe R markdown file
- ‘CodeBook.Rmd’:
- ‘CodeBook.pdf’: PDF of the CodeBook R markdown file
- ‘run_analysis.R’: Script that takes the tidy’s the
- ‘training_set.txt’: File that combines ‘X_train.txt’, ‘y_train.txt’, and ‘subject_train.txt’ to the tidy specifications defined by the course “Getting and Cleaning Data” project specifications.

- ‘testing_set.txt’: File that combines ‘X_test.txt’, ‘y_test.txt’, and ‘subject_train.txt’ to the tidy specifications defined by the course “Getting and Cleaning Data” project specifications.
- ‘training_set_averages.txt’: File that uses the ‘training_set.txt’ to calculate the average of both the mean and standard deviation for acceleration data across subject and activity
- ‘testing_set_averages.txt’: File that uses the ‘testing_set.txt’ to calculate the average of both mean and standard deviation for acceleration data across subject and activity
- ‘UCI HAR Dataset/README.txt’: README that describes the original dataset
- ‘UCI HAR Dataset/features_info.txt’: Shows information about the variables used on the feature vector.
- ‘UCI HAR Dataset/features.txt’: List of all features.
- ‘UCI HAR Dataset/activity_labels.txt’: Links the class labels with their activity name.
- ‘UCI HAR Dataset/train/X_train.txt’: Training set.
- ‘UCI HAR Dataset/train/y_train.txt’: Training labels.
- ‘UCI HAR Dataset/test/X_test.txt’: Test set.
- ‘UCI HAR Dataset/test/y_test.txt’: Test labels.

The following files are available for the train and test data. Their descriptions are equivalent.

- ‘UCI HAR Dataset/train/subject_train.txt’: Each row identifies the subject who performed the activity for each window sample. Its range is from 1 to 30.
- ‘UCI HAR Dataset/train/Inertial Signals/total_acc_x_train.txt’: The acceleration signal from the smartphone accelerometer X axis in standard gravity units ‘g’. Every row shows a 128 element vector. The same description applies for the ‘total_acc_x_train.txt’ and ‘total_acc_z_train.txt’ files for the Y and Z axis.
- ‘UCI HAR Dataset/train/Inertial Signals/body_acc_x_train.txt’: The body acceleration signal obtained by subtracting the gravity from the total acceleration.
- ‘UCI HAR Dataset/train/Inertial Signals/body_gyro_x_train.txt’: The angular velocity vector measured by the gyroscope for each window sample. The units are radians/second.

Notes:

- Features are normalized and bounded within [-1,1].
- Each feature vector is a row on the text file.

For more information about this dataset contact: activityrecognition@smartlab.ws

Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.