

An Adaptation of “Human Activity Recognition Using Smartphones Data Set”

Study Design

This study is a course project to demonstrate data handling and summary. It specifies a source data project (see readme) and specific columns and summarization to apply. Also see the read me for steps to recreate the dataset.

Output dataset: UCIHAR.csv

Code Book

Below is a list of columns in the UCIHAR.csv dataset. This dataset is a summary of the HAR data referred to in the readme file. Please refer to the original study for more detailed information on the collection and analysis of the data. Here is an excerpt from the source project’s readme file.

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.

Note on column names: This naming convention complies with the guidelines defined in the 4th week lecture on variable/column name. The guideline is to use all lowercase, no whitespace, and to NOT abbreviate any words.

UCIHAR.csv Column Name	Source Feature Name	Description
subjectidentifier		Identifier associated with the person carrying the cell phone collecting data.
activitydescription		Activity type, e.g. Standing, Walking
timeseriesbodyacceleratoremeanxaxis	tBodyAcc-mean()-X	This and following measures are the mean of the source project values within the subjectidentifier and activitydescription. Refer to the source project for the units and details for each measure.
timeseriesbodyacceleratoremeanyaxis	tBodyAcc-mean()-Y	
timeseriesbodyacceleratoremeanzaxis	tBodyAcc-mean()-Z	
timeseriesbodyacceleratorstandarddeviationxaxis	tBodyAcc-std()-X	
timeseriesbodyacceleratorstandarddeviationyaxis	tBodyAcc-std()-Y	
timeseriesbodyacceleratorstandarddeviationzaxis	tBodyAcc-std()-Z	
timeseriesgravityacceleratoremeanxaxis	tGravityAcc-mean()-X	
timeseriesgravityacceleratoremeanyaxis	tGravityAcc-mean()-Y	
timeseriesgravityacceleratoremeanzaxis	tGravityAcc-mean()-Z	
timeseriesgravityacceleratorstandarddeviationxaxis	tGravityAcc-std()-X	See above
timeseriesgravityacceleratorstandarddeviationyaxis	tGravityAcc-std()-Y	
timeseriesgravityacceleratorstandarddeviationzaxis	tGravityAcc-std()-Z	
timeseriesbodyacceleratorjerkmeanxaxis	tBodyAccJerk-mean()-X	
timeseriesbodyacceleratorjerkmeanyaxis	tBodyAccJerk-mean()-Y	
timeseriesbodyacceleratorjerkmeanzaxis	tBodyAccJerk-mean()-Z	
timeseriesbodyacceleratorjerkstandarddeviationxaxis	tBodyAccJerk-std()-X	
timeseriesbodyacceleratorjerkstandarddeviationyaxis	tBodyAccJerk-std()-Y	
timeseriesbodyacceleratorjerkstandarddeviationzaxis	tBodyAccJerk-std()-Z	
timeseriesbodygyroscopemeanxaxis	tBodyGyro-mean()-X	See above
timeseriesbodygyroscopemeanyaxis	tBodyGyro-mean()-Y	See above

UCIHAR.csv Column Name	Source Feature Name	Description
timeseriesbodygyroscopemeanxaxis	tBodyGyro-mean()-Z	See above
timeseriesbodygyroscopestandarddeviationxaxis	tBodyGyro-std()-X	See above
timeseriesbodygyroscopestandarddeviationyaxis	tBodyGyro-std()-Y	See above
timeseriesbodygyroscopestandarddeviationzaxis	tBodyGyro-std()-Z	See above
timeseriesbodygyroscopejerkmeanxaxis	tBodyGyroJerk-mean()-X	See above
timeseriesbodygyroscopejerkmeanyaxis	tBodyGyroJerk-mean()-Y	See above
timeseriesbodygyroscopejerkmeanzaxis	tBodyGyroJerk-mean()-Z	See above
timeseriesbodygyroscopejerkstandarddeviationxaxis	tBodyGyroJerk-std()-X	See above
timeseriesbodygyroscopejerkstandarddeviationyaxis	tBodyGyroJerk-std()-Y	See above
timeseriesbodygyroscopejerkstandarddeviationzaxis	tBodyGyroJerk-std()-Z	See above
timeseriesbodyaccelerormagnitudemean	tBodyAccMag-mean()	See above
timeseriesbodyaccelerormagnitudestandarddeviation	tBodyAccMag-std()	See above
timeseriesgravityaccelerormagnitudemean	tGravityAccMag-mean()	See above
timeseriesgravityaccelerormagnitudestandarddeviation	tGravityAccMag-std()	See above
timeseriesbodyacceleratorjerkmagnitudemean	tBodyAccJerkMag-mean()	See above
timeseriesbodyacceleratorjerkmagnitudestandarddeviation	tBodyAccJerkMag-std()	See above
timeseriesbodygyroscopemagnitudemean	tBodyGyroMag-mean()	See above
timeseriesbodygyroscopemagnitudestandarddeviation	tBodyGyroMag-std()	See above
timeseriesbodygyroscopejerkmagnitudemean	tBodyGyroJerkMag-mean()	See above
timeseriesbodygyroscopejerkmagnitudestandarddeviation	tBodyGyroJerkMag-std()	See above
frequencybodyaccelerormeanxaxis	fBodyAcc-mean()-X	See above
frequencybodyaccelerormeanyaxis	fBodyAcc-mean()-Y	See above
frequencybodyaccelerormeanzaxis	fBodyAcc-mean()-Z	See above
frequencybodyacceleratorstandarddeviationxaxis	fBodyAcc-std()-X	See above
frequencybodyacceleratorstandarddeviationyaxis	fBodyAcc-std()-Y	See above
frequencybodyacceleratorstandarddeviationzaxis	fBodyAcc-std()-Z	See above
frequencybodyacceleratorjerkmeanxaxis	fBodyAccJerk-mean()-X	See above
frequencybodyacceleratorjerkmeanyaxis	fBodyAccJerk-mean()-Y	See above

UCIHAR.csv Column Name	Source Feature Name	Description
frequencybodyacceleratorjerkmeanxaxis	fBodyAccJerk-mean()-Z	See above
frequencybodyacceleratorjerkstandarddeviationxaxis	fBodyAccJerk-std()-X	See above
frequencybodyacceleratorjerkstandarddeviationyaxis	fBodyAccJerk-std()-Y	See above
frequencybodyacceleratorjerkstandarddeviationzaxis	fBodyAccJerk-std()-Z	See above
frequencybodygyroscopemeanxaxis	fBodyGyro-mean()-X	See above
frequencybodygyroscopemeanxaxis	fBodyGyro-mean()-Y	See above
frequencybodygyroscopemeanxaxis	fBodyGyro-mean()-Z	See above
frequencybodygyroscopestandarddeviationxaxis	fBodyGyro-std()-X	See above
frequencybodygyroscopestandarddeviationyaxis	fBodyGyro-std()-Y	See above
frequencybodygyroscopestandarddeviationzaxis	fBodyGyro-std()-Z	See above
frequencybodyacceleratormagnitude	fBodyAccMag-mean()	See above
frequencybodyacceleratormagnitude	fBodyAccMag-std()	See above
frequencybodybodyacceleratorjerkmagnitudemean	fBodyBodyAccJerkMag-mean()	See above
frequencybodybodyacceleratorjerkmagnitudestandarddeviation	fBodyBodyAccJerkMag-std()	See above
frequencybodybodygyroscopemagnitudemean	fBodyBodyGyroMag-mean()	See above
frequencybodybodygyroscopemagnitudestandarddeviation	fBodyBodyGyroMag-std()	See above
frequencybodybodygyroscopemagnitudestandarddeviation	fBodyBodyGyroJerkMag-mean()	See above
frequencybodybodygyroscopemagnitudestandarddeviation	fBodyBodyGyroJerkMag-std()	See above