User Guid to the 20e_TotalData_tidy File

20e jiang's coursera assignment
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User's Guide

ACKNOWLEDGEMENTS

This data set is based on the experiments carried out by Jorge L. Reyes-Ortiz, Davide Anguita, Alessandro Ghio, Luca Oneto, edited by 20e Jiang for the peer-assignment of the coursera course —— getting and cleaning data.

Use of this dataset in publications must be acknowledged by referencing the following publication [1]

[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

20e_TotalData_tidy

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External links

A full description for the original dataset is available at the site where the data was obtained:
http://archive.ics.uci.edu/ml/datasets/Human+Activity+Recognition+Using+Smartphones

Here are the data for the project:
https://d396qusza40orc.cloudfront.net/getdata%2Fprojectfiles%2FUCI%20HAR%20Dataset.zip

I. Introduction

This dataset summarized the average of the mean and standard deviation of datas per subject per activity, which means.

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. Features are normalized and bounded within [-1,1].

II. Record counts

Counts of features

Observations	813621
Features	81
Subjects	30
Activities	6

Counts from different subjects

Record count	10299
Subject 1	347
Subject 2	302
Subject 3	341
Subject 4	317
Subject 5	302
Subject 6	325
Subject 7	308
Subject 8	281
Subject 9	288
Subject 10	294
Subject 11	316
Subject 12	320
Subject 13	327
Subject 14	323
Subject 15	328
Subject 16	366
Subject 17	368
Subject 18	364
Subject 19	360
Subject 20	354

Subject 21	408
Subject 22	321
Subject 23	372
Subject 24	381
Subject 25	409
Subject 26	392
Subject 27	376
Subject 28	382
Subject 29	344
Subject 30	383

Counts of different activities

Record count	10299
Laying	1944
Sitting	1777
Walking	1722
Walking downstairs	1406
Walking upstairs	1544
Standing	1906

III. List of data elements and locations

List of data elements and locations

data elements	location
subject	1
activity	2
timeBodyAcc.mean.X	3
timeBodyAcc.mean.Y	4
timeBodyAcc.mean.Z	5
timeBodyAcc.std.X	6
timeBodyAcc.std.Y	7
timeBodyAcc.std.Z	8
timeGravityAcc.mean.X	9
timeGravityAcc.mean.Y	10
timeGravityAcc.mean.Z	11
timeGravityAcc.std.X	12
timeGravityAcc.std.Y	13
timeGravityAcc.std.Z	14
timeBodyAccJerk.mean.X	15

List of data elements and locations

timeBodyAccJerk.mean.Y	16
timeBodyAccJerk.mean.Z	17
timeBodyAccJerk.std.X	18
timeBodyAccJerk.std.Y	19
timeBodyAccJerk.std.Z	20
timeBodyGyro.mean.X	21
timeBodyGyro.mean.Y	22
timeBodyGyro.mean.Z	23
timeBodyGyro.std.X	24
timeBodyGyro.std.Y	25
timeBodyGyro.std.Z	26
timeBodyGyroJerk.mean.X	27
timeBodyGyroJerk.mean.Y	28
timeBodyGyroJerk.mean.Z	29
timeBodyGyroJerk.std.X	30

List of data elements and locations

timeBodyGyroJerk.std.Y	31
timeBodyGyroJerk.std.Z	32
timeBodyAccMag.mean	33
timeBodyAccMag.std	34
timeGravityAccMag.mean	35
timeGravityAccMag.std	36
timeBodyAccJerkMag.mean	37
timeBodyAccJerkMag.std	38
timeBodyGyroMag.mean	39
timeBodyGyroMag.std	40
timeBodyGyroJerkMag.mean	41
timeBodyGyroJerkMag.std	42
freqBodyAcc.mean.X	43
freqBodyAcc.mean.Y	44
freqBodyAcc.mean.Z	45

List of data elements and locations

freqBodyAcc.std.X	46
freqBodyAcc.std.Y	47
freqBodyAcc.std.Z	48
freqBodyAcc.meanFreq.X	49
freqBodyAcc.meanFreq.Y	50
freqBodyAcc.meanFreq.Z	51
freqBodyAccJerk.mean.X	52
freqBodyAccJerk.mean.Y	53
freqBodyAccJerk.mean.Z	54
freqBodyAccJerk.std.X	55
freqBodyAccJerk.std.Y	56
freqBodyAccJerk.std.Z	57
freqBodyAccJerk.meanFreq.X	58
freqBodyAccJerk.meanFreq.Y	59
freqBodyAccJerk.meanFreq.Z	60

List of data elements and locations

freqBodyGyro.mean.X	61
freqBodyGyro.mean.Y	62
freqBodyGyro.mean.Z	63
freqBodyGyro.std.X	64
freqBodyGyro.std.Y	65
freqBodyGyro.std.Z	66
freqBodyGyro.meanFreq.X	67
freqBodyGyro.meanFreq.Y	68
freqBodyGyro.meanFreq.Z	69
freqBodyAccMag.mean	70
freqBodyAccMag.std	71
freqBodyAccMag.meanFreq	72
freqBodyBodyAccJerkMag.mean	73
freqBodyBodyAccJerkMag.std	74
freqBodyBodyAccJerkMag.meanFreq	75

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freqBodyBodyGyroMag.mean	76
freqBodyBodyGyroMag.std	77
freqBodyBodyGyroMag.meanFreq	78
freqBodyBodyGyroJerkMag.mean	79
freqBodyBodyGyroJerkMag.std	80
freqBodyBodyGyroJerkMag.meanFreq	81

IV. Record layout

Location	Data elements	A,S
1	subject	1
		2
		3
		4
		5
		6
		7
		8
		9
		10
		11
		12
		13
		14
		15
		16
		17
		18
		19
		20
		21
		22
		23
		24
		25
		26
		27
		28
		29
		30

Location	Data elements	A,S
2	activity	Laying
		Sitting
		Walking
		Walking downstairs
		Walking upstairs
		Standing

V. Definition of items and codes

1.Definition

（1） mean: Mean value

（2）std: Standard deviation

（3）time: time domain signals

（4）freq: frequency domain signals(Fast Fourier Transform applied)

（5）Body: Body

（6）Gravity: Gravity

（7）Acc: accelerometer

（8）Gyro: gyroscope

（9）Jerk: be derived in time to obtain Jerk signals

（10） Mag: magnitude of these three-dimensional signals calculated using the Euclidean norm

（11） .XYZ: 3-axial signals in the X, Y and Z directions.

2.Explanation

2.1 time domain signals

timeAcc.XYZ: data from the accelerometer 3-axial raw signals.

These time domain signals 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. The acceleration signal was separated using another low pass Butterworth filter with a corner frequency of 0.3 Hz.

2.1.1 timeBodyAcc.XYZ: body acceleration signals

timeBodyAccJerk.XYZ: the body linear acceleration was derived in time to obtain Jerk signals

2.1.2 timeGravityAcc.XYZ: gravity acceleration signals

2.2 timeGyro.XYZ: data from the gyroscope 3-axial raw signals

2.2.1 tBodyGyroJerk.XYZ: the angular velocity acceleration was derived in time to obtain Jerk signals

2.2 frequency domain signals

A Fast Fourier Transform (FFT) was applied to some of these signals producing freqBodyAcc.XYZ, freqBodyAccJerk.XYZ, freqBodyGyro.XYZ, freqBodyAccJerkMag, freqBodyGyroMag, freqBodyGyroJerkMag.