CodeBook

Fabien Nugier

11/8/2019

Data source

The data is obtained from the following project:

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

and the initial data set in downloaded from the following url:

https://d396qusza40orc.cloudfront.net/getdata%2Fprojectfiles%2FUCI%20HAR%20Dataset.zip

Variables

We extract from initial data only the measurements on the mean and standard deviation. We obtain the following list for our variables:

```
listvariables
```

[[1]] [1] “tBodyAcc-mean-X”

[[2]] [1] “tBodyAcc-mean-Y”

[[3]] [1] “tBodyAcc-mean-Z”

[[4]] [1] “tBodyAcc-std-X”

[[5]] [1] “tBodyAcc-std-Y”

[[6]] [1] “tBodyAcc-std-Z”

[[7]] [1] “tGravityAcc-mean-X”

[[8]] [1] “tGravityAcc-mean-Y”

[[9]] [1] “tGravityAcc-mean-Z”

[[10]] [1] “tGravityAcc-std-X”

[[11]] [1] “tGravityAcc-std-Y”

[[12]] [1] “tGravityAcc-std-Z”

[[13]] [1] “tBodyAccJerk-mean-X”

[[14]] [1] “tBodyAccJerk-mean-Y”

[[15]] [1] “tBodyAccJerk-mean-Z”

[[16]] [1] “tBodyAccJerk-std-X”

[[17]] [1] “tBodyAccJerk-std-Y”

[[18]] [1] “tBodyAccJerk-std-Z”

[[19]] [1] “tBodyGyro-mean-X”

[[20]] [1] “tBodyGyro-mean-Y”

[[21]] [1] “tBodyGyro-mean-Z”

[[22]] [1] “tBodyGyro-std-X”

[[23]] [1] “tBodyGyro-std-Y”

[[24]] [1] “tBodyGyro-std-Z”

[[25]] [1] “tBodyGyroJerk-mean-X”

[[26]] [1] “tBodyGyroJerk-mean-Y”

[[27]] [1] “tBodyGyroJerk-mean-Z”

[[28]] [1] “tBodyGyroJerk-std-X”

[[29]] [1] “tBodyGyroJerk-std-Y”

[[30]] [1] “tBodyGyroJerk-std-Z”

[[31]] [1] “tBodyAccMag-mean”

[[32]] [1] “tBodyAccMag-std”

[[33]] [1] “tGravityAccMag-mean”

[[34]] [1] “tGravityAccMag-std”

[[35]] [1] “tBodyAccJerkMag-mean”

[[36]] [1] “tBodyAccJerkMag-std”

[[37]] [1] “tBodyGyroMag-mean”

[[38]] [1] “tBodyGyroMag-std”

[[39]] [1] “tBodyGyroJerkMag-mean”

[[40]] [1] “tBodyGyroJerkMag-std”

[[41]] [1] “fBodyAcc-mean-X”

[[42]] [1] “fBodyAcc-mean-Y”

[[43]] [1] “fBodyAcc-mean-Z”

[[44]] [1] “fBodyAcc-std-X”

[[45]] [1] “fBodyAcc-std-Y”

[[46]] [1] “fBodyAcc-std-Z”

[[47]] [1] “fBodyAcc-meanFreq-X”

[[48]] [1] “fBodyAcc-meanFreq-Y”

[[49]] [1] “fBodyAcc-meanFreq-Z”

[[50]] [1] “fBodyAccJerk-mean-X”

[[51]] [1] “fBodyAccJerk-mean-Y”

[[52]] [1] “fBodyAccJerk-mean-Z”

[[53]] [1] “fBodyAccJerk-std-X”

[[54]] [1] “fBodyAccJerk-std-Y”

[[55]] [1] “fBodyAccJerk-std-Z”

[[56]] [1] “fBodyAccJerk-meanFreq-X”

[[57]] [1] “fBodyAccJerk-meanFreq-Y”

[[58]] [1] “fBodyAccJerk-meanFreq-Z”

[[59]] [1] “fBodyGyro-mean-X”

[[60]] [1] “fBodyGyro-mean-Y”

[[61]] [1] “fBodyGyro-mean-Z”

[[62]] [1] “fBodyGyro-std-X”

[[63]] [1] “fBodyGyro-std-Y”

[[64]] [1] “fBodyGyro-std-Z”

[[65]] [1] “fBodyGyro-meanFreq-X”

[[66]] [1] “fBodyGyro-meanFreq-Y”

[[67]] [1] “fBodyGyro-meanFreq-Z”

[[68]] [1] “fBodyAccMag-mean”

[[69]] [1] “fBodyAccMag-std”

[[70]] [1] “fBodyAccMag-meanFreq”

[[71]] [1] “fBodyBodyAccJerkMag-mean”

[[72]] [1] “fBodyBodyAccJerkMag-std”

[[73]] [1] “fBodyBodyAccJerkMag-meanFreq”

[[74]] [1] “fBodyBodyGyroMag-mean”

[[75]] [1] “fBodyBodyGyroMag-std”

[[76]] [1] “fBodyBodyGyroMag-meanFreq”

[[77]] [1] “fBodyBodyGyroJerkMag-mean”

[[78]] [1] “fBodyBodyGyroJerkMag-std”

[[79]] [1] “fBodyBodyGyroJerkMag-meanFreq”

[[80]] [1] “activity”

Features

The original feature file describes well enough the variable since their names has only been slightly changed (removing “()” for “mean()” and “std()”). However, there is now a category variable called “activity” at the end of the table.

Concerning the other variables, let us quote the original feature file:

> The features selected for this database come from the accelerometer and gyroscope 3-axial raw signals tAcc-XYZ and tGyro-XYZ. These time domain signals (prefix ‘t’ to denote time) 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. Similarly, the acceleration signal was then separated into body and gravity acceleration signals (tBodyAcc-XYZ and tGravityAcc-XYZ) using another low pass Butterworth filter with a corner frequency of 0.3 Hz.
>
> Subsequently, the body linear acceleration and angular velocity were derived in time to obtain Jerk signals (tBodyAccJerk-XYZ and tBodyGyroJerk-XYZ). Also the magnitude of these three-dimensional signals were calculated using the Euclidean norm (tBodyAccMag, tGravityAccMag, tBodyAccJerkMag, tBodyGyroMag, tBodyGyroJerkMag).

Finally a Fast Fourier Transform (FFT) was applied to some of these signals producing fBodyAcc-XYZ, fBodyAccJerk-XYZ, fBodyGyro-XYZ, fBodyAccJerkMag, fBodyGyroMag, fBodyGyroJerk-Mag. (Note the 'f' to indicate frequency domain signals).

These signals were used to estimate variables of the feature vector for each pattern:
'-XYZ' is used to denote 3-axial signals in the X, Y and Z directions.