CodeBoook

The averages selected for this dataset come from the accelerometer and gyroscope 3-axial raw signals tAcc-XYZ and tGyro-XYZ. 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. Similarly, the acceleration signal was then separated into body and gravity acceleration signals (TimeBodyAccelerationXYZ and TimeGravityAccelerationXYZ) 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 (TimeBodyAccelerationJerkXYZ and TimeBodyGyroscopicJerkXYZ). Also the magnitude of these three-dimensional signals were calculated using the Euclidean norm (TimeBodyAccelerationMagnitude, TimeGravityAccelerationMagnitude, TimeBodyAccelerationJerkMagnitude, TimeBodyGyroscopicMagnitude, TimeBodyGyroscopicJerkMagnitude).

Finally a Fast Fourier Transform (FFT) was applied to some of these signals producing FreqBodyAccelerationXYZ, FreqBodyAccelerationJerkXYZ, FreqBodyGyroscopicXYZ, FreqBodyAccelerationJerkMagnitude, FreqBodyGyroscopicMagnitude, FreqBodyGyroscopicJerkMagnitude.

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.

From the set of variables that were estimated from these signals we selected:

Mean: Mean value
StDev: Standard deviation

TimeBodyAccelerationMeanX
TimeBodyAccelerationMeanY
TimeBodyAccelerationMeanZ
TimeBodyAccelerationStDevX
TimeBodyAccelerationStDevY
TimeBodyAccelerationStDevZ
TimeGravityAccelerationMeanX
TimeGravityAccelerationMeanY
TimeGravityAccelerationMeanZ
TimeGravityAccelerationStDevX
TimeGravityAccelerationStDevY
TimeGravityAccelerationStDevZ
TimeBodyAccelerationJerkMeanX
TimeBodyAccelerationJerkMeanY
TimeBodyAccelerationJerkMeanZ
TimeBodyAccelerationJerkStDevX
TimeBodyAccelerationJerkStDevY
TimeBodyAccelerationJerkStDevZ
TimeBodyGyroscopicMeanX
TimeBodyGyroscopicMeanY
TimeBodyGyroscopicMeanZ
TimeBodyGyroscopicStDevX
TimeBodyGyroscopicStDevY
TimeBodyGyroscopicStDevZ
TimeBodyGyroscopicJerkMeanX
TimeBodyGyroscopicJerkMeanY
TimeBodyGyroscopicJerkMeanZ
TimeBodyGyroscopicJerkStDevX
TimeBodyGyroscopicJerkStDevY
TimeBodyGyroscopicJerkStDevZ

TimeBodyAccelerationMagnitudeMean
TimeBodyAccelerationMagnitudeStDev
TimeGravityAccelerationMagnitudeMean
TimeGravityAccelerationMagnitudeStDev
TimeBodyAccelerationJerkMagnitudeMean
TimeBodyAccelerationJerkMagnitudeStDev
TimeBodyGyroscopicMagnitudeMean
TimeBodyGyroscopicMagnitudeStDev
TimeBodyGyroscopicJerkMagnitudeMean
TimeBodyGyroscopicJerkMagnitudeStDev
FreqBodyAccelerationMeanX
FreqBodyAccelerationMeanY
FreqBodyAccelerationMeanZ
FreqBodyAccelerationStDevX
FreqBodyAccelerationStDevY
FreqBodyAccelerationStDevZ
FreqBodyAccelerationJerkMeanX
FreqBodyAccelerationJerkMeanY
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FreqBodyGyroscopicStDevY
FreqBodyGyroscopicStDevZ
FreqBodyAccelerationMagnitudeMean
FreqBodyAccelerationMagnitudeStDev
FreqBodyAccelerationJerkMagnitudeMean
FreqBodyAccelerationJerkMagnitudeStDev
FreqBodyGyroscopicMagnitudeMean
FreqBodyGyroscopicMagnitudeStDev
FreqBodyGyroscopicJerkMagnitudeMean
FreqBodyGyroscopicJerkMagnitudeStDev

Then we created a tidy data set with the average of each variable for each activity and each subject.
Activity
Subject

The activity names are the following:
walking
walkingupstairs
walkingdownstairs
sitting
standing
laying

Subject's ID is a number between 1 and 30, for a total of 30 subjects.