CODE BOOK OF FEATURES

The features selected for this database come from the accelerometer and gyroscope 3-axial raw signals TimeAccelerometer-XYZ and TimeGyroscope-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 (TimeBodyAccelerometer-XYZ and TimeGravityAcc-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 (TimeBodyAccelerometerJerk-XYZ and TimeBodyGyroscopeJerk-XYZ). Also the magnitude of these three-dimensional signals were calculated using the Euclidean norm (TimeBodyAccelerometerMagnitude, TimeGravityAccelerometerMagnitude, TimeBodyAccelerometerJerkMagnitude, TimeBodyGyroscopeMagnitude, TimeBodyGyroscopeJerkMag).

Finally a Fast Fourier Transform (FFT) was applied to some of these signals producing FrequencyBodyAccelerometer-XYZ, FrequencyBodyAccelerometerJerk-XYZ, FrequencyBodyGyroscope-XYZ, FrequencyBodyAccelerometerJerkMagnitude, FrequencyBodyGyroscopeMagnitude, FrequencyBodyGyroscopeJerkMagnitude.

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.

- TimeBodyAccelerometer-XYZ
- TimeGravityAccelerometer-XYZ
- TimeBodyAccelerometerJerk-XYZ
- TimeBodyGyroscope-XYZ
- TimeBodyGyroscopeJerk-XYZ
- TimeBodyAccelerometerMag
- TimeGravityAccelerometerMag
- TimeBodyAccelerometerJerkMag
- TimeBodyGyroscopeMag
- TimeBodyGyroscopeJerkMag
- FrequencyBodyAccelerometer-XYZ
- FrequencyBodyAccelerometerJerk-XYZ
- FrequencyBodyGyroscope-XYZ
- FrequencyBodyAccelerometerMag
- FrequencyBodyAccelerometerJerkMag
- FrequencyBodyGyroscopeMag
- FrequencyBodyGyroscopeJerkMag

The set of variables that were estimated from these signals are:

- mean(): Mean value
- std(): Standard deviation
- meanFreq(): Weighted average of the frequency components to obtain a mean frequency

Additional vectors obtained by averaging the signals in a signal window sample. These are used on the angle() variable:

- GravityMean
- TimeBodyAccelerometerMean
- TimeBodyAccelerometerJerkMean
- TimeBodyGyroscopeMean
- TimeBodyGyroscopeJerkMean