

Codebook for course project for Getting and Cleaning Data

This codebook has been written based on the feature description of the original problem set data and reuses much of that material.

Background information:

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, fBodyGyroJerkMag. (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.

tBodyAcc-XYZ
tGravityAcc-XYZ
tBodyAccJerk-XYZ
tBodyGyro-XYZ
tBodyGyroJerk-XYZ
tBodyAccMag
tGravityAccMag
tBodyAccJerkMag
tBodyGyroMag
tBodyGyroJerkMag
fBodyAcc-XYZ
fBodyAccJerk-XYZ
fBodyGyro-XYZ
fBodyAccMag
fBodyAccJerkMag
fBodyGyroMag
fBodyGyroJerkMag

Two of the set of variables that were estimated from these signals are (additional variables in the input set have been omitted):

mean(): Mean value
std(): Standard deviation

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

gravityMean
tBodyAccMean
tBodyAccJerkMean
tBodyGyroMean
tBodyGyroJerkMean

Output description:

The output file contains 180 rows and 81 columns. The columns are as described below:

subjectId

- Number between 1 and 30 (inclusive)
- Indicates subject that observation pertains to

activityName

- Character
- One of (WALKING, WALKING_UPSTAIRS, WALKING_DOWNSTAIRS, SITTING, STANDING, LAYING)

The following 79 variables are mean values of the MEAN and STD readings in the test and training files in the original data set. These values are normalized and in the range [-1, 1].

meanOf.tBodyAcc.mean.X	Mean value of the Time Body Acceleration signal mean value along X axis
meanOf.tBodyAcc.mean.Y	Mean value of the Time Body Acceleration signal mean value along Y axis
meanOf.tBodyAcc.mean.Z	Mean value of the Time Body Acceleration signal mean value along Z axis
meanOf.tGravityAcc.mean.X	Mean value of the Time Gravity Acceleration signal mean value along X axis
meanOf.tGravityAcc.mean.Y	Mean value of the Time Gravity Acceleration signal mean value along Y axis
meanOf.tGravityAcc.mean.Z	Mean value of the Time Gravity Acceleration signal mean value along Z axis
meanOf.tBodyAccJerk.mean.X	Mean value of the Time Body Acceleration Jerk signal mean value along X axis
meanOf.tBodyAccJerk.mean.Y	Mean value of the Time Body Acceleration Jerk signal mean value along Y axis
meanOf.tBodyAccJerk.mean.Z	Mean value of the Time Body Acceleration Jerk signal mean value along Z axis
meanOf.tBodyGyro.mean.X	Mean value of the Time Body Gyroscopic signal mean value along X axis
meanOf.tBodyGyro.mean.Y	Mean value of the Time Body Gyroscopic signal mean value along Y axis
meanOf.tBodyGyro.mean.Z	Mean value of the Time Body Gyroscopic signal mean value along Z axis
meanOf.tBodyGyroJerk.mean.X	Mean value of the Time Body Gyroscopic Jerk signal mean value along X axis
meanOf.tBodyGyroJerk.mean.Y	Mean value of the Time Body Gyroscopic Jerk signal mean value along Y axis
meanOf.tBodyGyroJerk.mean.Z	Mean value of the Time Body Gyroscopic Jerk signal mean value along Z axis
meanOf.tBodyAccMag.mean	Mean value of the Time Body Acceleration signal magnitude mean value
meanOf.tGravityAccMag.mean	Mean value of the Time Gravity Acceleration signal magnitude mean value
meanOf.tBodyAccJerkMag.mean	Mean value of the Time Body Acceleration Jerk signal magnitude mean value
meanOf.tBodyGyroMag.mean	Mean value of the Time Body Gyroscopic signal magnitude mean

	value
meanOf.tBodyGyroJerkMag.mean	Mean value of the Time Body Gyroscopic Jerk signal magnitude mean value
meanOf.fBodyAcc.mean.X	Mean value of the Frequency Body Acceleration signal mean value along X axis
meanOf.fBodyAcc.mean.Y	Mean value of the Frequency Body Acceleration signal mean value along Y axis
meanOf.fBodyAcc.mean.Z	Mean value of the Frequency Body Acceleration signal mean value along Z axis
meanOf.fBodyAcc.meanFreq.X	Mean value of the Frequency Body Acceleration signal mean frequency value along X axis
meanOf.fBodyAcc.meanFreq.Y	Mean value of the Frequency Body Acceleration signal mean frequency value along Y axis
meanOf.fBodyAcc.meanFreq.Z	Mean value of the Frequency Body Acceleration signal mean frequency value along Z axis
meanOf.fBodyAccJerk.mean.X	Mean value of the Frequency Body Acceleration Jerk signal mean value along X axis
meanOf.fBodyAccJerk.mean.Y	Mean value of the Frequency Body Acceleration Jerk signal mean value along Y axis
meanOf.fBodyAccJerk.mean.Z	Mean value of the Frequency Body Acceleration Jerk signal mean value along Z axis
meanOf.fBodyAccJerk.meanFreq.X	Mean value of the Frequency Body Acceleration Jerk signal mean frequency value along X axis
meanOf.fBodyAccJerk.meanFreq.Y	Mean value of the Frequency Body Acceleration Jerk signal mean frequency value along Y axis
meanOf.fBodyAccJerk.meanFreq.Z	Mean value of the Frequency Body Acceleration Jerk signal mean frequency value along Z axis
meanOf.fBodyGyro.mean.X	Mean value of the Frequency Body Gyroscopic signal mean value along X axis
meanOf.fBodyGyro.mean.Y	Mean value of the Frequency Body Gyroscopic signal mean value along Y axis
meanOf.fBodyGyro.mean.Z	Mean value of the Frequency Body Gyroscopic signal mean value along Z axis
meanOf.fBodyGyro.meanFreq.X	Mean value of the Frequency Body Gyroscopic signal mean frequency value along X axis
meanOf.fBodyGyro.meanFreq.Y	Mean value of the Frequency Body Gyroscopic signal mean frequency value along Y axis
meanOf.fBodyGyro.meanFreq.Z	Mean value of the Frequency Body Gyroscopic signal mean frequency value along Z axis
meanOf.fBodyAccMag.mean	Mean value of the Frequency Body Acceleration signal magnitude mean value
meanOf.fBodyAccMag.meanFreq	Mean value of the Frequency Body Acceleration signal magnitude mean frequency value
meanOf.fBodyBodyAccJerkMag.mean	Mean value of the Frequency Body Body Acceleration Jerk signal magnitude mean value
meanOf.fBodyBodyAccJerkMag.meanFreq	Mean value of the Frequency Body Body Acceleration Jerk signal magnitude mean frequency value
meanOf.fBodyBodyGyroMag.mean	Mean value of the Frequency Body Body Gyroscopic signal magnitude mean value
meanOf.fBodyBodyGyroMag.meanFreq	Mean value of the Frequency Body Body Gyroscopic signal magnitude mean frequency value
meanOf.fBodyBodyGyroJerkMag.mean	Mean value of the Frequency Body Body Gyroscopic Jerk signal magnitude mean value
meanOf.fBodyBodyGyroJerkMag.meanFreq	Mean value of the Frequency Body Body Gyroscopic Jerk signal magnitude mean frequency value
meanOf.tBodyAcc.std.X	Mean value of the Time Body Acceleration signal std deviation

	value along X axis
meanOf.tBodyAcc.std.Y	Mean value of the Time Body Acceleration signal std deviation value along Y axis
meanOf.tBodyAcc.std.Z	Mean value of the Time Body Acceleration signal std deviation value along Z axis
meanOf.tGravityAcc.std.X	Mean value of the Time Gravity Acceleration signal std deviation value along X axis
meanOf.tGravityAcc.std.Y	Mean value of the Time Gravity Acceleration signal std deviation value along Y axis
meanOf.tGravityAcc.std.Z	Mean value of the Time Gravity Acceleration signal std deviation value along Z axis
meanOf.tBodyAccJerk.std.X	Mean value of the Time Body Acceleration Jerk signal std deviation value along X axis
meanOf.tBodyAccJerk.std.Y	Mean value of the Time Body Acceleration Jerk signal std deviation value along Y axis
meanOf.tBodyAccJerk.std.Z	Mean value of the Time Body Acceleration Jerk signal std deviation value along Z axis
meanOf.tBodyGyro.std.X	Mean value of the Time Body Gyroscopic signal std deviation value along X axis
meanOf.tBodyGyro.std.Y	Mean value of the Time Body Gyroscopic signal std deviation value along Y axis
meanOf.tBodyGyro.std.Z	Mean value of the Time Body Gyroscopic signal std deviation value along Z axis
meanOf.tBodyGyroJerk.std.X	Mean value of the Time Body Gyroscopic Jerk signal std deviation value along X axis
meanOf.tBodyGyroJerk.std.Y	Mean value of the Time Body Gyroscopic Jerk signal std deviation value along Y axis
meanOf.tBodyGyroJerk.std.Z	Mean value of the Time Body Gyroscopic Jerk signal std deviation value along Z axis
meanOf.tBodyAccMag.std	Mean value of the Time Body Acceleration signal magnitude std deviation value
meanOf.tGravityAccMag.std	Mean value of the Time Gravity Acceleration signal magnitude std deviation value
meanOf.tBodyAccJerkMag.std	Mean value of the Time Body Acceleration Jerk signal magnitude std deviation value
meanOf.tBodyGyroMag.std	Mean value of the Time Body Gyroscopic signal magnitude std deviation value
meanOf.tBodyGyroJerkMag.std	Mean value of the Time Body Gyroscopic Jerk signal magnitude std deviation value
meanOf.fBodyAcc.std.X	Mean value of the Frequency Body Acceleration signal std deviation value along X axis
meanOf.fBodyAcc.std.Y	Mean value of the Frequency Body Acceleration signal std deviation value along Y axis
meanOf.fBodyAcc.std.Z	Mean value of the Frequency Body Acceleration signal std deviation value along Z axis
meanOf.fBodyAccJerk.std.X	Mean value of the Frequency Body Acceleration Jerk signal std deviation value along X axis
meanOf.fBodyAccJerk.std.Y	Mean value of the Frequency Body Acceleration Jerk signal std deviation value along Y axis
meanOf.fBodyAccJerk.std.Z	Mean value of the Frequency Body Acceleration Jerk signal std deviation value along Z axis
meanOf.fBodyGyro.std.X	Mean value of the Frequency Body Gyroscopic signal std deviation value along X axis
meanOf.fBodyGyro.std.Y	Mean value of the Frequency Body Gyroscopic signal std deviation value along Y axis
meanOf.fBodyGyro.std.Z	Mean value of the Frequency Body Gyroscopic signal std deviation value along Z axis

	deviation value along Z axis
meanOf.fBodyAccMag.std	Mean value of the Frequency Body Acceleration signal magnitude std deviation value
meanOf.fBodyBodyAccJerkMag.std	Mean value of the Frequency Body Body Acceleration Jerk signal magnitude std deviation value
meanOf.fBodyBodyGyroMag.std	Mean value of the Frequency Body Body Gyroscopic signal magnitude std deviation value
meanOf.fBodyBodyGyroJerkMag.std	Mean value of the Frequency Body Body Gyroscopic Jerk signal magnitude std deviation value