DATA DICTIONARY

The fields in the data are taken from the accelerometer and gyroscope readings of 30 volunteers performing a series of activities.

This data dictionary describes the variables of two files with identical the same features:

1. complete.training.test.data – has the individual observations.
2. average.by.subject.and.activity (exported as “Step5\_Data.txt”) – has the means of the observations by subject and activity.

The fields in the data set are:

Subject

1-30 denoting which of the volunteer the observation was taken from

Activity

Description in English of the activity, as denoted by the label.code.

Label.codes

1 WALKING

2 WALKING\_UPSTAIRS

3 WALKING\_DOWNSTAIRS

4 SITTING

5 STANDING

6 LAYING

The remaining features are listed below:

tBodyAcc-mean()-X

tBodyAcc-mean()-Y

tBodyAcc-mean()-Z

tBodyAcc-std()-X

tBodyAcc-std()-Y

tBodyAcc-std()-Z

tGravityAcc-mean()-X

tGravityAcc-mean()-Y

tGravityAcc-mean()-Z

tGravityAcc-std()-X

tGravityAcc-std()-Y

tGravityAcc-std()-Z

tBodyAccJerk-mean()-X

tBodyAccJerk-mean()-Y

tBodyAccJerk-mean()-Z

tBodyAccJerk-std()-X

tBodyAccJerk-std()-Y

tBodyAccJerk-std()-Z

tBodyGyro-mean()-X

tBodyGyro-mean()-Y

tBodyGyro-mean()-Z

tBodyGyro-std()-X

tBodyGyro-std()-Y

tBodyGyro-std()-Z

tBodyGyroJerk-mean()-X

tBodyGyroJerk-mean()-Y

tBodyGyroJerk-mean()-Z

tBodyGyroJerk-std()-X

tBodyGyroJerk-std()-Y

tBodyGyroJerk-std()-Z

tBodyAccMag-mean()

tBodyAccMag-std()

tGravityAccMag-mean()

tGravityAccMag-std()

tBodyAccJerkMag-mean()

tBodyAccJerkMag-std()

tBodyGyroMag-mean()"

tBodyGyroMag-std()

tBodyGyroJerkMag-mean()

tBodyGyroJerkMag-std()

fBodyAcc-mean()-X

fBodyAcc-mean()-Y

fBodyAcc-mean()-Z

fBodyAcc-std()-X

fBodyAcc-std()-Y

fBodyAcc-std()-Z

fBodyAcc-meanFreq()-X

fBodyAcc-meanFreq()-Y

fBodyAcc-meanFreq()-Z

fBodyAccJerk-mean()-X

fBodyAccJerk-mean()-Y

fBodyAccJerk-mean()-Z

fBodyAccJerk-std()-X

fBodyAccJerk-std()-Y

fBodyAccJerk-std()-Z

fBodyAccJerk-meanFreq()-X

fBodyAccJerk-meanFreq()-Y

fBodyAccJerk-meanFreq()-Z

fBodyGyro-mean()-X

fBodyGyro-mean()-Y

fBodyGyro-mean()-Z

fBodyGyro-std()-X

fBodyGyro-std()-Y

fBodyGyro-std()-Z

fBodyGyro-meanFreq()-X

fBodyGyro-meanFreq()-Y

fBodyGyro-meanFreq()-Z

fBodyAccMag-mean()

fBodyAccMag-std()

fBodyAccMag-meanFreq()

fBodyBodyAccJerkMag-mean()

fBodyBodyAccJerkMag-std()

fBodyBodyAccJerkMag-meanFreq()

fBodyBodyGyroMag-mean()

fBodyBodyGyroMag-std()

fBodyBodyGyroMag-meanFreq()

fBodyBodyGyroJerkMag-mean()

fBodyBodyGyroJerkMag-std()

fBodyBodyGyroJerkMag-meanFreq()

The following features have the word Mean in their names, but were exclude from the dataset, as they were deemed not to be means.

angle(tBodyAccMean,gravity)

angle(tBodyAccJerkMean),gravityMean)

angle(tBodyGyroMean,gravityMean)

angle(tBodyGyroJerkMean,gravityMean)

angle(X,gravityMean)

angle(Y,gravityMean)

angle(Z,gravityMean)

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.The following explanations from feature\_info.txt explain the nature of each of the features retained: