**Getting and Cleaning Data Project Code Book**

The data in this project tidy dataset has been summarized and prepared from the “Human Activity Recognition Using Smartphones Dataset” produced by Davide Anguita, Alessandro Ghio, Luca Oneto, Xavier Parra and Jorge L. Reyes-Ortiz. [1]

Their study recorded the movements of 30 volunteers (subjects) performing 6 activities (walking, walking\_upstairs, walking\_downstairs, sitting, standing, laying) . Their movements were recorded through the accelerometer and gyroscope embedded in a smartphone (Samsunbg Galaxy S II) attached to their waist.

Further descriptions of the Full Dataset can be found on the following site:

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

The summary dataset produced in this project has one record for each of the volunteers (subjects) for each activity (walking, walking\_upstairs, walking\_downstairs, sitting, standing, laying).

There are a total of 180 records covering the 30 subjects across the 6 activities.

For each subject and activity combination there are a series of summaries which are the averages of the means and std deviations of the underlying measurements that were recorded in the “Human Activity Recognition Using Smartphones Dataset”. (UCI HAR dataset)

The UCI HAR dataset measurements came 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. The acceleration signal was separated into body and gravity acceleration signals (tBodyAcc-XYZ and tGravityAcc-XYZ).

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 (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).

Variables in the summary dataset:

1. activity\_no The activity being done by the subject
2. activity Description of the activity
3. subject ID of the volunteer

Measurements:

tBodyAcc-mean()-X

Mean of the body acceleration in X direction

tBodyAcc-mean()-Y

Mean of the body acceleration in Y direction

tBodyAcc-mean()-Z

Mean of the body acceleration in Z direction

tBodyAcc-std()-X

Std dev of the body acceleration in X direction

tBodyAcc-std()-Y

Std dev of the body acceleration in Y direction

tBodyAcc-std()-Z

Std dev of the body acceleration in Z direction

tGravityAcc-mean()-X

Mean of the gravity acceleration in X direction

tGravityAcc-mean()-Y

Mean of the gravity acceleration in Y direction

tGravityAcc-mean()-Z

Mean of the gravity acceleration in Z direction

tGravityAcc-std()-X

Std dev of the gravity acceleration in X direction

tGravityAcc-std()-Y

Std dev of the gravity acceleration in Y direction

tGravityAcc-std()-Z

Std dev of the gravity acceleration in Z direction

tBodyAccJerk-mean()-X

Mean of the Jerk signal of the body acceleration in X direction

tBodyAccJerk-mean()-Y

Mean of the Jerk signal of the body acceleration in Y direction

tBodyAccJerk-mean()-Z

Mean of the Jerk signal of the body acceleration in Z direction

tBodyAccJerk-std()-X

Std dev of the Jerk signal of the body acceleration in X direction

tBodyAccJerk-std()-Y

Std dev of the Jerk signal of the body acceleration in Y direction

tBodyAccJerk-std()-Z

Std dev of the Jerk signal of the body acceleration in Z direction

tBodyGyro-mean()-X

Mean of the body gyroscope in X direction

tBodyGyro-mean()-Y

Mean of the body gyroscope in Y direction

tBodyGyro-mean()-Z

Mean of the body gyroscope in Z direction

tBodyGyro-std()-X

Std dev of body gyroscope in X direction

tBodyGyro-std()-Y

Std dev of the body gyroscope in Y direction

tBodyGyro-std()-Z

Std dev of the body gyroscope in Z direction

tBodyGyroJerk-mean()-X

Mean of the Jerk signal of the body gyroscope in X direction

tBodyGyroJerk-mean()-Y

Mean of the Jerk signal of the body gyroscope in Y direction

tBodyGyroJerk-mean()-Z

Mean of the Jerk signal of the body gyroscope in Z direction

tBodyGyroJerk-std()-X

Std dev of the Jerk signal of the body gyroscope in X direction

tBodyGyroJerk-std()-Y

Std dev of the Jerk signal of the body gyroscope in Y direction

tBodyGyroJerk-std()-Z

Std dev of the Jerk signal of the body gyroscope in Z direction

tBodyAccMag-mean()

Mean of the magnitude of the body acceleration

tBodyAccMag-std()

Std dev of the magnitude of the body acceleration

tGravityAccMag-mean()

Mean of the magnitude of the gravity acceleration

tGravityAccMag-std()

Std dev of the magnitude of the gravity acceleration

tBodyAccJerkMag-mean()

Mean of the magnitude of the jerk signal of the body acceleration

tBodyAccJerkMag-std()

Std dev of the magnitude of the jerk signal of the body acceleration

tBodyGyroMag-mean()

Mean of the magnitude of the body gyroscope

tBodyGyroMag-std()

Std dev of the magnitude of the body gyroscope

tBodyGyroJerkMag-mean()

Mean of the magnitude of the jerk signal of the body gyroscope

tBodyGyroJerkMag-std()

Std dev of the magnitude of the jerk signal of the body gyroscope

fBodyAcc-mean()-X

Mean of the Fast Fourier Transform of the body acceleration in X direction

fBodyAcc-mean()-Y

Mean of the Fast Fourier Transform of the body acceleration in Y direction

fBodyAcc-mean()-Z

Mean of the Fast Fourier Transform of the body acceleration in Z direction

fBodyAcc-std()-X

Std dev of the Fast Fourier Transform of the body acceleration in X direction

fBodyAcc-std()-Y

Mean of the Fast Fourier Transform of the body acceleration in Y direction

fBodyAcc-std()-Z

Mean of the Fast Fourier Transform of the body acceleration in Z direction

fBodyAccJerk-mean()-X

Mean of the Fast Fourier Transform of the jerk signal of body acceleration in X direction

fBodyAccJerk-mean()-Y

Mean of the Fast Fourier Transform of the jerk signal of body acceleration in Y direction

fBodyAccJerk-mean()-Z

Mean of the Fast Fourier Transform of the jerk signal of body acceleration in Z direction

fBodyAccJerk-std()-X

Std dev of the Fast Fourier Transform of the jerk signal of body acceleration in X direction

fBodyAccJerk-std()-Y

Std dev of the Fast Fourier Transform of the jerk signal of body acceleration in Y direction

fBodyAccJerk-std()-Z

Std dev of the Fast Fourier Transform of the jerk signal of body acceleration in Z direction

fBodyGyro-mean()-X

Mean of the Fast Fourier Transform of the gyro acceleration in X direction

fBodyGyro-mean()-Y

Mean of the Fast Fourier Transform of the gyro acceleration in Y direction

fBodyGyro-mean()-Z

Mean of the Fast Fourier Transform of the gyro acceleration in Z direction

fBodyGyro-std()-X

Std dev of the Fast Fourier Transform of the gyro acceleration in X direction

fBodyGyro-std()-Y

Mean of the Fast Fourier Transform of the gyro acceleration in Y direction

fBodyGyro-std()-Z

Mean of the Fast Fourier Transform of the gyro acceleration in X direction

fBodyAccMag-mean()

Mean of the Fast Fourier Transform of the magnitude of body acceleration

fBodyAccMag-std()

Std dev of the Fast Fourier Transform of the magnitude of body acceleration

fBodyBodyAccJerkMag-mean()

Mean of the Fast Fourier Transform of the magnitude of the jerk signal of the body acceleration

fBodyBodyAccJerkMag-std()

Std dev of the Fast Fourier Transform of the magnitude of the jerk signal of the body acceleration

fBodyBodyGyroMag-mean()

Mean of the Fast Fourier Transform of the magnitude of the body gyroscope

fBodyBodyGyroMag-std()

Std dev of the Fast Fourier Transform of the magnitude of the body gyroscope

fBodyBodyGyroJerkMag-mean()

Mean of the Fast Fourier Transform of the magnitude of the jerk signal of the body gyroscope

fBodyBodyGyroJerkMag-std()

Std dev of the Fast Fourier Transform of the magnitude of the jerk signal of the body gyroscope

References

[1] Davide Anguita, Alessandro Ghio, Luca Oneto, Xavier Parra and Jorge L. Reyes-Ortiz. Human Activity Recognition on Smartphones using a Multiclass Hardware-Friendly Support Vector Machine. International Workshop of Ambient Assisted Living (IWAAL 2012). Vitoria-Gasteiz, Spain. Dec 2012