**Data Dictionary for Human Activity Recognition Using Smartphones Dataset**
*(prepared 8-21-14 by TRM for Coursera Getting and Cleaning Data Course Assignment)*

**1:**    activity
Represents one of six activities conducted by subject:  walking, walkingupstairs, walking downstairs, sitting, standing, layingdown

**2:**    subject
Represents which subject (of 30) measurements were conducted on

**3-81:**
Remaining 79 variables represent the **mean or standard deviation** of measurements conducted on subject at an activity.

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

Thus the variables captured were:

| 3 | tBodyAccmeanX |
|---|---|
| 4 | tBodyAccmeanY |
| 5 | tBodyAccmeanZ |
| 6 | tBodyAccstdX |
| 7 | tBodyAccstdY |
| 8 | tBodyAccstdZ |
| 9 | tGravityAccmeanX |
| 10 | tGravityAccmeanY |
| 11 | tGravityAccmeanZ |
| 12 | tGravityAccstdX |
| 13 | tGravityAccstdY |
| 14 | tGravityAccstdZ |
| 15 | tBodyAccJerkmeanX |
| 16 | tBodyAccJerkmeanY |
| 17 | tBodyAccJerkmeanZ |
| 18 | tBodyAccJerkstdX |
| 19 | tBodyAccJerkstdY |
| 20 | tBodyAccJerkstdZ |
| 21 | tBodyGyromeanX |
| 22 | tBodyGyromeanY |
| 23 | tBodyGyromeanZ |
| 24 | tBodyGyrostdX |
| 25 | tBodyGyrostdY |
| 26 | tBodyGyrostdZ |
| 27 | tBodyGyroJerkmeanX |
| 28 | tBodyGyroJerkmeanY |
| 29 | tBodyGyroJerkmeanZ |
| 30 | tBodyGyroJerkstdX |
| 31 | tBodyGyroJerkstdY |
| 32 | tBodyGyroJerkstdZ |
| 33 | tBodyAccMagmean |
| 34 | tBodyAccMagstd |
| 35 | tGravityAccMagmean |
| 36 | tGravityAccMagstd |
| 37 | tBodyAccJerkMagmean |
| 38 | tBodyAccJerkMagstd |
| 39 | tBodyGyroMagmean |
| 40 | tBodyGyroMagstd |
| 41 | tBodyGyroJerkMagmean |
| 42 | tBodyGyroJerkMagstd |
| 43 | fBodyAccmeanX |
| 44 | fBodyAccmeanY |
| 45 | fBodyAccmeanZ |
| 46 | fBodyAccstdX |
| 47 | fBodyAccstdY |
| 48 | fBodyAccstdZ |
| 49 | fBodyAccmeanFreqX |

| 50 | fBodyAccmeanFreqY |
| 51 | fBodyAccmeanFreqZ |
| 52 | fBodyAccJerkmeanX |
| 53 | fBodyAccJerkmeanY |
| 54 | fBodyAccJerkmeanZ |
| 55 | fBodyAccJerkstdX |
| 56 | fBodyAccJerkstdY |
| 57 | fBodyAccJerkstdZ |
| 58 | fBodyAccJerkmeanFreqX |
| 59 | fBodyAccJerkmeanFreqY |
| 60 | fBodyAccJerkmeanFreqZ |
| 61 | fBodyGyromeanX |
| 62 | fBodyGyromeanY |
| 63 | fBodyGyromeanZ |
| 64 | fBodyGyrostdX |
| 65 | fBodyGyrostdY |
| 66 | fBodyGyrostdZ |
| 67 | fBodyGyromeanFreqX |
| 68 | fBodyGyromeanFreqY |
| 69 | fBodyGyromeanFreqZ |
| 70 | fBodyAccMagmean |
| 71 | fBodyAccMagstd |
| 72 | fBodyAccMagmeanFreq |
| 73 | fBodyBodyAccJerkMagmean |
| 74 | fBodyBodyAccJerkMagstd |
| 75 | fBodyBodyAccJerkMagmeanFreq |
| 76 | fBodyBodyGyroMagmean |
| 77 | fBodyBodyGyroMagstd |
| 78 | fBodyBodyGyroMagmeanFreq |
| 79 | fBodyBodyGyroJerkMagmean |
| 80 | fBodyBodyGyroJerkMagstd |
| 81 | fBodyBodyGyroJerkMagmeanFreq |