**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