

Human Activity Recognition Using Smartphones Dataset: Feature description

- Two instruments : Accelerometer and Gyroscope
- Two types of measurements: Acceleration and Frequency
- Acceleration: measured directly from the instruments.
- Frequency: derived by applying Fast Fourier Transform(FFT) to some of the signals from the instruments.
- Signals: 3-axial time domain signals from each instrument: Time domain Accelerator signal on X,Y,Z-axis and Time domain Accelerator signal.
- Acceleration signals further split into two types: Body acceleration and Gravity.
- Jerk signals: obtained from derived linear acceleration and angular velocity in time of the accelerometer and gyroscope signals of each of the 3-axial dimensions.
- Magnitude signals: magnitudes of the 3-axial signals are estimated using Euclidean norm.
- For each of these signals 17 measurements are done. For this project we focus on only the mean and standard derivation.
- There are additional vectors obtained by averaging the signals in a signal window sample. These are used to obtain the 'angle' variable.

DATA DICTIONARY - Getting and Cleaning Data Course Project USING Human Activity Recognition Using Smartphones Dataset		
Feature no.	Column Name	Description
1	"Activity"	6 activities observed. Factor with 6 levels: "LAYING", "SITTING", "STANDING", "WALKING", "WALKING_DOWNSTAIRS", "WALKING_UPSTAIRS"
2	"UserID"	30 subjects of the study. Coded as numbers from 1 to 30.
3	"TimeBodyAccXMean"	Mean of time domain Body Acceleration signal in X-axial direction.
4	"TimeBodyAccYMean"	Mean of time domain Body Acceleration signal in Y-axial direction.
5	"TimeBodyAccZMean"	Mean of time domain Body Acceleration signal in Z-axial direction.
6	"TimeBodyAccXStd"	Standard deviation of time domain Body Acceleration signal in X-axial direction.
7	"TimeBodyAccYStd"	Standard deviation of time domain Body Acceleration signal in Y-axial direction.
8	"TimeBodyAccZStd"	Standard deviation of time domain Body Acceleration signal in Z-axial direction.

9	"TimeGravityAccXMean"	Mean of time domain Gravity Acceleration signal in X-axial direction.
10	"TimeGravityAccYMean"	Mean of time domain Gravity Acceleration signal in Y-axial direction.
11	"TimeGravityAccZMean"	Mean of time domain Gravity Acceleration signal in Z-axial direction.
12	"TimeGravityAccXStd"	Standard deviation of time domain Gravity Acceleration signal in X-axial direction.
13	"TimeGravityAccYStd"	Standard deviation of time domain Gravity Acceleration signal in Y-axial direction.
14	"TimeGravityAccZStd"	Standard deviation of time domain Gravity Acceleration signal in Z-axial direction.
15	"TimeBodyAccJerkXMean"	Mean of time domain body's derived linear acceleration - X-axis
16	"TimeBodyAccJerkYMean"	Mean of time domain body's derived linear acceleration - Y-axis
17	"TimeBodyAccJerkZMean"	Mean of derived time body's derived linear acceleration - Z-axis
18	"TimeBodyAccJerkXStd"	Standard deviation of time domain body's derived linear acceleration - X-axis
19	"TimeBodyAccJerkYStd"	Standard deviation of time domain body's derived linear acceleration - Y-axis
20	"TimeBodyAccJerkZStd"	Standard deviation of derived time domain body's linear acceleration - Z-axis
21	"TimeBodyGyroXMean"	Mean of time domain Body Gyroscope signal in X-axial direction.
22	"TimeBodyGyroYMean"	Mean of time domain Body Gyroscope signal in Y-axial direction.
23	"TimeBodyGyroZMean"	Mean of time domain Body Gyroscope signal in Z-axial direction.
24	"TimeBodyGyroXStd"	Standard deviation of time domain Body Gyroscope signal in X-axial direction.
25	"TimeBodyGyroYStd"	Standard deviation of time domain Body Gyroscope signal in Y-axial direction.
26	"TimeBodyGyroZStd"	Standard deviation of time domain Body Gyroscope signal in Z-axial direction.
27	"TimeBodyGyroJerkXMean"	Mean of time domain body's derived angular velocity - X-axis
28	"TimeBodyGyroJerkYMean"	Mean of time domain body's derived angular velocity - Y-axis
29	"TimeBodyGyroJerkZMean"	Mean of time domain body's derived angular velocity - Z-axis

30	"TimeBodyGyroJerkXStd"	Standard deviation of time domain body's derived angular velocity - X-axis
31	"TimeBodyGyroJerkYStd"	Standard deviation of time domain body's derived angular velocity - Y-axis
32	"TimeBodyGyroJerkZStd"	Standard deviation of time domain body's derived angular velocity - Z-axis
33	"TimeBodyAccMagMean"	Mean of the magnitude of time domain body's acceleration signal.
34	"TimeBodyAccMagStd"	Standard deviation of the magnitude of time domain body's acceleration signal.
35	"TimeGravityAccMagMean"	Mean of the magnitude of time domain gravity's acceleration signal.
36	"TimeGravityAccMagStd"	Standard deviation of the magnitude of time domain body's acceleration signal.
37	"TimeBodyAccJerkMagMean"	Mean of the magnitude of time domain body's linear acceleration.
38	"TimeBodyAccJerkMagStd"	Standard deviation of the magnitude of time domain body's acceleration signal.
39	"TimeBodyGyroMagMean"	Mean of the magnitude of time domain body's gyroscope signal.
40	"TimeBodyGyroMagStd"	Standard deviation of the magnitude of time domain body's acceleration signal.
41	"TimeBodyGyroJerkMagMean"	Mean of the magnitude of time domain body's angular velocity.
42	"TimeBodyGyroJerkMagStd"	Standard deviation of the magnitude of time domain body's acceleration signal.
43	"FrequencyBodyAccXMean"	Mean of frequency of time domain Body Acceleration signal in X-axial direction.
44	"FrequencyBodyAccYMean"	Mean of frequency of time domain Body Acceleration signal in Y-axial direction.
45	"FrequencyBodyAccZMean"	Mean of frequency of time domain Body Acceleration signal in Z-axial direction.
46	"FrequencyBodyAccXStd"	Standard deviation of frequency of time domain Body Acceleration signal in X-axial direction.
47	"FrequencyBodyAccYStd"	Standard deviation of frequency of time domain Body Acceleration signal in Y-axial direction.
48	"FrequencyBodyAccZStd"	Standard deviation of frequency of time domain Body Acceleration signal in Z-axial direction.
49	"FrequencyBodyAccJerkXMean"	Mean of frequency of time domain body's derived linear acceleration - X-axis
50	"FrequencyBodyAccJerkYMean"	Mean of frequency of time domain body's derived linear acceleration - Y-axis

51	"FrequencyBodyAccJer kZMean"	Mean of frequency of time domain body's derived linear acceleration - Z-axis
52	"FrequencyBodyAccJer kXStd"	Standard deviation of frequency of time domain body's derived linear acceleration - X-axis
53	"FrequencyBodyAccJer kYStd"	Standard deviation of frequency of time domain body's derived linear acceleration - Y-axis
54	"FrequencyBodyAccJer kZStd"	Standard deviation of frequency of time domain body's derived linear acceleration - Z-axis
55	"FrequencyBodyGyroX Mean"	Mean of frequency of time domain Body Gyroscope signal in X-axial direction.
56	"FrequencyBodyGyroY Mean"	Mean of frequency of time domain Body Gyroscope signal in Y-axial direction.
57	"FrequencyBodyGyroZ Mean"	Mean of frequency of time domain Body Gyroscope signal in Z-axial direction.
58	"FrequencyBodyGyroX Std"	Standard deviation of frequency of time domain Body Gyroscope signal in X-axial direction.
59	"FrequencyBodyGyroY Std"	Standard deviation of frequency of time domain Body Gyroscope signal in Y-axial direction.
60	"FrequencyBodyGyroZ Std"	Standard deviation of frequency of time domain Body Gyroscope signal in Z-axial direction.
61	"FrequencyBodyAccMa gMean"	Mean of the frequency of magnitude of time domain body's acceleration signal.
62	"FrequencyBodyAccMa gStd"	Standard deviation of the frequency of magnitude of time domain body's acceleration signal.
63	"FrequencyBodyAccJer kMagMean"	Mean of the frequency of magnitude of time domain body's linear acceleration.
64	"FrequencyBodyAccJer kMagStd"	Standard deviation of the frequency of magnitude of time domain body's linear acceleration.
65	"FrequencyBodyGyroM agMean"	Mean of the frequency of magnitude of time domain body's gyroscope signal.
66	"FrequencyBodyGyroM agStd"	Standard deviation of the frequency of magnitude of time domain body's gyroscope signal.
67	"FrequencyBodyGyroJe rkMagMean"	Mean of the frequency of magnitude of time domain body's angular velocity.
68	"FrequencyBodyGyroJe rkMagStd"	Standard deviation of the frequency of magnitude of time domain body's angular velocity.