DATA DICTIONARY – run_analysis

The variables for this data set come from the following data set:

Human Activity Recognition Using Smartphones Dataset

Version 1.0

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The following is information regarding the original data set:

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.

For the RUN_ANALYSIS data set, the set of variables that were estimated from these signals are:

mean(): Mean value

std(): Standard deviation

Subsequently, the average for each variable was calculated for each Subject (person carrying out the experiment) and Activity performed ("WALKING", "WALKING_UP", "WALKING_DOWN", "SITTING", "STANDING", "LAYING").

In total, there are 81 variables used in this data set:

SubjectID – person carrying out the experiment

Activity – one of six activities performed while wearing the smartphone

("WALKING", "WALKING_UP", "WALKING_DOWN", "SITTING", "STANDING", "LAYING")

And the average of the following variables, defined below, measured by the device, summarized by SubjectID and by Activity:

tBodyAcc-mean()-X - Average of time domain body acceleration signal on X axis using Accelerometer

tBodyAcc-mean()-Y - Average of time domain body acceleration signal on Y axis using Accelerometer

tBodyAcc-mean()-Z - Average of time domain body acceleration signal on Z axis using Accelerometer

tBodyAcc-std()-X – Standard deviation of time domain body acceleration signal on X axis using Accelerometer

tBodyAcc-std()-Y - Standard deviation of time domain body acceleration signal on Y axis using Accelerometer

tBodyAcc-std()-Z - Standard deviation of time domain body acceleration signal on Z axis using Accelerometer

tGravityAcc-mean()-X - Average of time domain gravity acceleration signal on X axis using Accelerometer

tGravityAcc-mean()-Y - Average of time domain gravity acceleration signal on Y axis using Accelerometer

tGravityAcc-mean()-Z - Average of time domain gravity acceleration signal on Z axis using Accelerometer

tGravityAcc-std()-X – Standard deviation of time domain gravity acceleration signal on X axis using Accelerometer

tGravityAcc-std()-Y– Standard deviation of time domain gravity acceleration signal on Y axis using Accelerometer

tGravityAcc-std()-Z – Standard deviation of time domain gravity acceleration signal on Z axis using Accelerometer

tBodyAccJerk-mean()-X – average of body linear acceleration derived in time to obtain Jerk signals – X axis using Accelerometer

tBodyAccJerk-mean()-Y- average of body linear acceleration derived in time to obtain Jerk signals – Y axis using Accelerometer

tBodyAccJerk-mean()-Z- average of body linear acceleration derived in time to obtain Jerk signals – Z axis using Accelerometer

tBodyAccJerk-std()-X – standard deviation of body linear acceleration derived in time to obtain Jerk signals – X axis using Accelerometer

tBodyAccJerk-std()-Y– standard deviation of body linear acceleration derived in time to obtain Jerk signals –Y axis using Accelerometer

tBodyAccJerk-std()-Z– standard deviation of body linear acceleration derived in time to obtain Jerk signals –Z axis using Accelerometer

tBodyGyro-mean()-X Average of time domain body acceleration signal on X axis using Gyroscope

tBodyGyro-mean()-Y- Average of time domain body acceleration signal on Y axis using Gyroscope

tBodyGyro-mean()-Z - Average of time domain body acceleration signal on Z axis using Gyroscope

tBodyGyro-std()-X– Standard deviation of time domain body acceleration signal on X axis using Gyroscope

tBodyGyro-std()-Y- Standard deviation of time domain body acceleration signal on Y axis using Gyroscope

tBodyGyro-std()-Z- Standard deviation of time domain body acceleration signal on Z axis using Gyroscope

tBodyGyroJerk-mean()-X – average of body linear acceleration derived in time to obtain Jerk signals – X axis using Gyroscope

tBodyGyroJerk-mean()-Y - average of body linear acceleration derived in time to obtain Jerk signals – Y axis using Gyroscope

tBodyGyroJerk-mean()-Z - average of body linear acceleration derived in time to obtain Jerk signals – Z axis using Gyroscope

tBodyGyroJerk-std()-X - standard deviation of body linear acceleration derived in time to obtain Jerk signals – X axis using Gyroscope

tBodyGyroJerk-std()-Y - standard deviation of body linear acceleration derived in time to obtain Jerk signals –Y axis using Gyroscope

tBodyGyroJerk-std()-Z - standard deviation of body linear acceleration derived in time to obtain Jerk signals –Z axis using Gyroscope

tBodyAccMag-mean() - Average of body linear acceleration time domain gravity acceleration signal using Accelerometer – magnitude calculated using Euclidean norm

tBodyAccMag-std()- Standard deviation of time domain body acceleration signal using Accelerometer – magnitude calculated using Euclidean norm

tGravityAccMag-mean()- Average of gravity linear acceleration time domain gravity acceleration signal using Accelerometer – magnitude calculated using Euclidean norm

tGravityAccMag-std() – Standard deviation of time domain gravity acceleration signal using Accelerometer – magnitude calculated using Euclidean norm

tBodyAccJerkMag-mean() - average of body linear acceleration derived in time to obtain Jerk signals – Z axis using Accelerometer; magnitude calculated using Euclidean norm

tBodyAccJerkMag-std()- standard deviation of body linear acceleration derived in time to obtain Jerk signals – Z axis using Accelerometer; magnitude calculated using Euclidean norm

tBodyGyroMag-mean() - average of body linear acceleration derived in time to obtain Jerk signals using Gyroscope; magnitude calculated using Euclidean norm

tBodyGyroMag-std()- standard deviation of body linear acceleration derived in time to obtain Jerk signals using Gyroscope; magnitude calculated using Euclidean norm

tBodyGyroJerkMag-mean() - average of body linear acceleration derived in time to obtain Jerk signals using Gyroscope; magnitude calculated using Euclidean norm

tBodyGyroJerkMag-std()- standard deviation of body linear acceleration derived in time to obtain Jerk signals using Gyroscope; magnitude calculated using Euclidean norm

fBodyAcc-mean()-X - see definition above, using frequency domain instead of time

fBodyAcc-mean()-Y- see definition above, using frequency domain instead of time

fBodyAcc-mean()-Z- see definition above, using frequency domain instead of time

fBodyAcc-std()-X- see definition above, using frequency domain instead of time

fBodyAcc-std()-Y- see definition above, using frequency domain instead of time

fBodyAcc-std()-Z- see definition above, using frequency domain instead of time

fBodyAcc-meanFreq()-X- see definition above, using frequency domain instead of time

fBodyAcc-meanFreq()-Y- see definition above, using frequency domain instead of time

fBodyAcc-meanFreq()-Z- see definition above, using frequency domain instead of time

fBodyAccJerk-mean()-X- see definition above, using frequency domain instead of time

fBodyAccJerk-mean()-Y- see definition above, using frequency domain instead of time

fBodyAccJerk-mean()-Z- see definition above, using frequency domain instead of time

fBodyAccJerk-std()-X- see definition above, using frequency domain instead of time

fBodyAccJerk-std()-Y- see definition above, using frequency domain instead of time

fBodyAccJerk-std()-Z- see definition above, using frequency domain instead of time

fBodyAccJerk-meanFreq()-X

fBodyAccJerk-meanFreq()-Y

fBodyAccJerk-meanFreq()-Z

fBodyGyro-mean()-X- see definition above, using frequency domain instead of time

fBodyGyro-mean()-Y- see definition above, using frequency domain instead of time

fBodyGyro-mean()-Z- see definition above, using frequency domain instead of time fBodyGyro-std()-X

fBodyGyro-std()-Y- see definition above, using frequency domain instead of time

fBodyGyro-std()-Z- see definition above, using frequency domain instead of time

fBodyGyro-meanFreq()-X- see definition above, using frequency domain instead of time

fBodyGyro-meanFreq()-Y- see definition above, using frequency domain instead of time

fBodyGyro-meanFreq()-Z- see definition above, using frequency domain instead of time

fBodyAccMag-mean()- see definition above, using frequency domain instead of time fBodyAccMag-std()

fBodyAccMag-meanFreq()

fBodyBodyAccJerkMag-mean()- see definition above, using frequency domain instead of time

fBodyBodyAccJerkMag-std()- see definition above, using frequency domain instead of time

fBodyBodyAccJerkMag-meanFreq()

fBodyBodyGyroMag-mean()- see definition above, using frequency domain instead of time

fBodyBodyGyroMag-std()- see definition above, using frequency domain instead of time

fBodyBodyGyroMag-meanFreq()

fBodyBodyGyroJerkMag-mean()- see definition above, using frequency domain instead of time

fBodyBodyGyroJerkMag-std()- see definition above, using frequency domain instead of time

fBodyBodyGyroJerkMag-meanFreq()