Code Book

This document describes the data contained in the tidy dataset produce by R script (run.analysis.R)

Data Set Description

The data comes for the Human Activity Recognition Using Smartphones Dataset (Version 1.0) and contains data collected from the accelerometers from the Samsung Galaxy S smartphone. A full description of the study and how the data were obtained is available at the site where the data was obtained:   
  
<http://archive.ics.uci.edu/ml/datasets/Human+Activity+Recognition+Using+Smartphones>

For the data set provided the original train (X\_train.txt) and test data (X\_train.txt) sets were combined and descriptive labels added.

Variables

The final data set contains factor variables

1. Subject identifier showing who carried out the experiment

2. Activity showing he activity in which they were involved (

3. 66 Features Variables

The variables extracted from the original data set are described as follows in the features\_info.txt file that accompanied the original data

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

The set of variables that were estimated from these signals are:

mean(): Mean value

std(): Standard deviation

For each variable the value presented is the arithmetic mean of the original raw data by Subject and Activity.