**Source Data**

A full description of the data used in this project can be found at [The UCI Machine Learning Repository](http://archive.ics.uci.edu/ml/datasets/Human+Activity+Recognition+Using+Smartphones)

[The source data for this project can be found here.](https://d396qusza40orc.cloudfront.net/getdata%2Fprojectfiles%2FUCI%20HAR%20Dataset.zip)

**Variables**

| **Variable Name** | **Description** |
| --- | --- |
| Subject | 1 to 2 |
| Subject Number | 1 to 30  (Unique identifier assigned to each subject) |
| Label | 6 to 18 |
| Activity Label | * Walking |
|  | * Walking upstairs |
|  | * Walking downstairs |
|  | * Sitting |
|  | * Standing |
|  | * Laying |
| tbodyaccmeanx | 12 |
| tbodyaccmeany | 12 |
| tbodyaccmeanz | 12 |
| tbodyaccstdx | 12 |
| tbodyaccstdy | 12 |
| tbodyaccstdz | 12 |
| tgravityaccmeanx | 12 |
| tgravityaccmeany | 12 |
| tgravityaccmeanz | 12 |
| tgravityaccstdx | 12 |
| tgravityaccstdy | 12 |
| tgravityaccstdz | 12 |
| tbodyaccjerkmeanx | 12 |
| tbodyaccjerkmeany | 12 |
| tbodyaccjerkmeanz | 12 |
| tbodyaccjerkstdx | 12 |
| tbodyaccjerkstdy | 12 |
| tbodyaccjerkstdz | 12 |
| tbodygyromeanx | 12 |
| tbodygyromeany | 12 |
| tbodygyromeanz | 12 |
| tbodygyrostdx | 12 |
| tbodygyrostdy | 12 |
| tbodygyrostdz | 12 |
| tbodygyrojerkmeanx | 12 |
| tbodygyrojerkmeany | 12 |
| tbodygyrojerkmeanz | 12 |
| tbodygyrojerkstdx | 12 |
| tbodygyrojerkstdy | 12 |
| tbodygyrojerkstdz | 12 |
| tbodyaccmagmean | 12 |
| tbodyaccmagstd | 12 |
| tgravityaccmagmean | 12 |
| tgravityaccmagstd | 12 |
| tbodyaccjerkmagmean | 12 |
| tbodyaccjerkmagstd | 12 |
| tbodygyromagmean | 12 |
| tbodygyromagstd | 12 |
| tbodygyrojerkmagmean | 12 |
| tbodygyrojerkmagstd | 12 |
| fbodyaccmeanx | 12 |
| fbodyaccmeany | 12 |
| fbodyaccmeanz | 12 |
| fbodyaccstdx | 12 |
| fbodyaccstdy | 12 |
| fbodyaccstdz | 12 |
| fbodyaccjerkmeanx | 12 |
| fbodyaccjerkmeany | 12 |
| fbodyaccjerkmeanz | 12 |
| fbodyaccjerkstdx | 12 |
| Fbodyaccjerkstdy | 12 |
| fbodyaccjerkstdz | 12 |
| fbodygyromeanx | 12 |
| Fbodygyromeany | 12 |
| fbodygyromeanz | 12 |
| fbodygyrostdx | 12 |
| fbodygyrostdy | 12 |
| fbodygyrostdz | 12 |
| fbodyaccmagmean | 12 |
| fbodyaccmagstd | 12 |
| fbodybodyaccjerkmagmean | 12 |
| fbodybodyaccjerkmagstd | 12 |
| fbodybodygyromagmean | 12 |
| fbodybodygyromagstd | 12 |
| fbodybodygyrojerkmagmean | 12 |
| fbodybodygyrojerkmagstd | 12 |

**Data Set Information**

The experiments were conducted with a group of 30 volunteers within an age bracket of 19 to 48 years old at the time of the study. Each person performed the following six activities:

* Walking
* Walking upstairs
* Walking downstairs
* Sitting
* Standing
* Laying

while wearing a smartphone (specifically, a Samsung Galaxy S II) on their waists. Using its embedded accelerometer and gyroscope, the smart phone captured 3-axial linear acceleration and 3-axial angular velocity at a constant rate of 50Hz. The experiments have been video-recorded to label the data manually. The obtained dataset has been randomly partitioned into two sets with 70% of the volunteers selected for generating the training data and 30% for producing the test data.

The sensor signals (accelerometer and gyroscope) were pre-processed by applying noise filters and then sampled in fixed-width sliding windows of 2.56 sec and 50% overlap (128 readings per window). The sensor acceleration signal (which has gravitational and body motion components) was separated using a Butterworth low-pass filter into body acceleration and gravity. The gravitational force is assumed to have only low frequency components; therefore, a filter with 0.3 Hz cutoff frequency was used. From each window, a vector of features was obtained by calculating variables from the time and frequency domains.

**Attribute Information**

For each record in the dataset, the following attributes are tracked:

* Triaxial acceleration from the accelerometer (total acceleration) and the estimated body acceleration
* Triaxial Angular velocity from the gyroscope
* A 561-feature vector with time and frequency domain variables
* Its activity label
* An identifier of the subject who carried out the experiment.

**Section 1. Merge the training and the test sets to create one data set**

After setting the source directory for the files, the following data tables are read from the source data files:

* **features.txt**
* **activity\_labels.txt**
* **subject\_train.txt**
* **x\_train.txt**
* **y\_train.txt**
* **subject\_test.txt**
* **x\_test.txt**
* **y\_test.txt**

Assign column names and merge all of this source data in order to create a single master data set.

**Section 2. Extract only the measurements on the mean and standard deviation for each measurement**

Create a logical vector that contains TRUE values for the ID, the mean or sample average, and the standard deviation columns and FALSE values for the others. Next, I subset this data so that only the necessary columns are kept.

**Section 3. Use descriptive activity names to name the activities in the data set**

Merge the requisite data with the activityType table to incorporate the descriptive activity names.

**Section 4. Appropriately label the data set with descriptive activity names**

Use the R programming language’s “GSUB” function for pattern replacement in order to clean the data labels.

**Section 5. Create a second, independent tidy data set with the average of each variable for each activity and each subject**

The end result of this project is to produce a single, tidy data set with the average of each variable for each activity and subject