**Codebook for tidy\_data.txt**

 Outline the steps in the assignment on tidy data

An experiment was conducted where a group of 30 volunteers each performed six activities (walking, walking upstairs, walking downstairs, sitting, standing, laying) wearing a smartphone (Samsung Galaxy S II) on the waist. The data generated by the embedded accelerometer and gyroscope in the smartphones were recorded.

A full description is available at

<http://archive.ics.uci.edu/ml/datasets/Human+Activity+Recognition+Using+Smartphones>

The data is available at

<https://d396qusza40orc.cloudfront.net/getdata%2Fprojectfiles%2FUCI%20HAR%20Dataset.zip>

**Raw Data**

The raw data relevant to this project is contained in 7 text files

X\_train.txt

y\_train.txt

subject\_train.txt

data stream 2

X\_test.txt

y\_test.txt

subject\_test.txt

In addition two other files contain additional data, which help explain the data

features.txt

activity\_labels.txt

**Data Manipulation**

All data manipulation was done (and can be replicated) by running the R script run\_analysis.R. In short:

1. The 2 data sets, train and test  are in three parts x, y, subject
2. Join these 2 data sets together by adding the extra columns on the end using cbind

Once you have the two data sets

1. Add these together using the rbind commands which adds one data set to the bottom of the other
2. Using the features table get the column names and add them to the new table
3. Find all the column names and make a subset of those containing either the mean or standard deviation values
4. Then use lapply to calculate the mean and standard deviations of those columns
5. Write the results to a table

**Variables**

**Variable Names**

All variable names (except "Subject" and "Activity") are a combination of:

* The domain (t or f): the t-domain denotes measurements made over time, while f-domain represents Fast Fourier Transformed variables derived from the t-domain variables.
* "Body" or "Gravity": some of the acceleration signals do not actually measure body-acceleration but gravity-acceleration.
* The axis of the measurement (X, Y or Z)
* The function: mean (Mean) or standard deviation (StdDev)
* A combination of "Acc" (for acceleration), "Gyro" (for angular velocity), "Jerk" (for jerk signals) and "Mag" (for magnitude).

"t.Body.Acc.Jerk.X.Mean" will therefore denote a measurement in the t-domain, showing body-acceleration jerk magnitude in the X-plane.

There are 68 variables in the dataset:

**1. Subject.** Integer. Denotes the person (subject) that performed the activities.

**2. Activity.** String. Describes the activity performed.

**3. t.Body.Acc.X.Mean** The average of the means of body-acceleration in the X-plane.

**4. t.Body.Acc.Y.Mean** The average of the means of body-acceleration in the Y-plane.

**5. t.Body.Acc.Z.Mean** The average of the means of body-acceleration in the Z-plane.

**6. t.Body.Acc.X.StdDev** The average of the standard deviations of body-acceleration in the X-plane.

**7. t.Body.Acc.Y.StdDev** The average of the standard deviations of body-acceleration in the Y-plane.

**8. t.Body.Acc.Z.StdDev** The average of the standard deviations of body-acceleration in the Z-plane.

**9. t.Gravity.Acc.X.Mean** The average of the means of gravity-acceleration in the X-plane.

**10. t.Gravity.Acc.Y.Mean** The average of the means of gravity-acceleration in the Y-plane.

**11. t.Gravity.Acc.Z.Mean** The average of the means of gravity-acceleration in the Z-plane.

**12. t.Gravity.Acc.X.StdDev** The average of the standard deviations of gravity-acceleration in the X-plane.

**13. t.Gravity.Acc.Y.StdDev** The average of the standard deviations of gravity-acceleration in the Y-plane.

**14. t.Gravity.Acc.Z.StdDev** The average of the standard deviations of gravity-acceleration in the Z-plane.

**15. t.Body.Acc.Jerk.X.Mean** The average of the means of body-acceleration jerk in the X-plane.

**16. t.Body.Acc.Jerk.Y.Mean** The average of the means of body-acceleration jerk in the Y-plane.

**17. t.Body.Acc.Jerk.Z.Mean** The average of the means of body-acceleration jerk in the Z-plane.

**18. t.Body.Acc.Jerk.X.StdDev** The average of the standard deviations of body-acceleration jerk in the X-plane.

**19. t.Body.Acc.Jerk.Y.StdDev** The average of the standard deviations of body-acceleration jerk in the Y-plane.

**20. t.Body.Acc.Jerk.Z.StdDev** The average of the standard deviations of body-acceleration jerk in the Z-plane.

**21. t.Body.Gyro.X.Mean** The average of the means of angular velocity in the X-plane.

**22. t.Body.Gyro.Y.Mean** The average of the means of angular velocity in the Y-plane.

**23. t.Body.Gyro.Z.Mean** The average of the means of angular velocity in the Z-plane.

**24. t.Body.Gyro.X.StdDev** The average of the standard deviations of angular velocity in the X-plane.

**25. t.Body.Gyro.Y.StdDev** The average of the standard deviations of angular velocity in the Y-plane.

**26. t.Body.Gyro.Z.StdDev** The average of the standard deviations of angular velocity in the Z-plane.

**27. t.Body.Gyro.Jerk.X.Mean** The average of the means of angular velocity jerk in the X-plane.

**28. t.Body.Gyro.Jerk.Y.Mean** The average of the means of angular velocity jerk in the Y-plane.

**29. t.Body.Gyro.Jerk.Z.Mean** The average of the means of angular velocity jerk in the Z-plane.

**30. t.Body.Gyro.Jerk.X.StdDev** The average of the standard deviations of angular velocity jerk in the X-plane.

**31. t.Body.Gyro.Jerk.Y.StdDev** The average of the standard deviations of angular velocity jerk in the Y-plane.

**32. t.Body.Gyro.Jerk.Z.StdDev** The average of the standard deviations of angular velocity jerk in the Z-plane.

**33. t.Body.Acc.Mag.Mean** The average of the means of body-acceleration magnitude.

**34. t.Body.Acc.Mag.StdDev** The average of the standard deviations of body-acceleration magnitude.

**35. t.Gravity.Acc.Mag.Mean** The average of the means of gravity-acceleration magnitude.

**36. t.Gravity.Acc.Mag.StdDev** The average of the standard deviations of gravity-acceleration magnitude.

**37. t.Body.Acc.Jerk.Mag.Mean** The average of the means of body-acceleration jerk magnitude.

**38. t.Body.Acc.Jerk.Mag.StdDev** The average of the standard deviations of body-acceleration jerk magnitude.

**39. t.Body.Gyro.Mag.Mean** The average of the means of angular velocity magnitude.

**40. t.Body.Gyro.Mag.StdDev** The average of the standard deviations of angular velocity magnitude.

**41. t.Body.Gyro.Jerk.Mag.Mean** The average of the means of angular velocity jerk magnitude.

**42. t.Body.Gyro.Jerk.Mag.StdDev** The average of the standard deviations of angular velocity jerk magnitude.

**43. f.Body.Acc.X.Mean** The average of the means of the Fast Fourier Transformation of body-acceleration in the X-plane.

**44. f.Body.Acc.Y.Mean** The average of the means of the Fast Fourier Transformation of body-acceleration in the Y-plane.

**45. f.Body.Acc.Z.Mean** The average of the means of the Fast Fourier Transformation of body-acceleration in the Z-plane.

**46. f.Body.Acc.X.StdDev** The average of the standard deviations of the Fast Fourier Transformation of body-acceleration in the X-plane.

**47. f.Body.Acc.Y.StdDev** The average of the standard deviations of the Fast Fourier Transformation of body-acceleration in the Y-plane.

**48. f.Body.Acc.Z.StdDev** The average of the standard deviations of the Fast Fourier Transformation of body-acceleration in the Z-plane.

**49. f.Body.Acc.Jerk.X.Mean** The average of the means of the Fast Fourier Transformation of body-acceleration jerk in the X-plane.

**50. f.Body.Acc.Jerk.Y.Mean** The average of the means of the Fast Fourier Transformation of body-acceleration jerk in the Y-plane.

**51. f.Body.Acc.Jerk.Z.Mean** The average of the means of the Fast Fourier Transformation of body-acceleration jerk in the Z-plane.

**52. f.Body.Acc.Jerk.X.StdDev** The average of the standard deviations of the Fast Fourier Transformation of body-acceleration jerk in the X-plane.

**53. f.Body.Acc.Jerk.Y.StdDev** The average of the standard deviations of the Fast Fourier Transformation of body-acceleration jerk in the Y-plane.

**54. f.Body.Acc.Jerk.Z.StdDev** The average of the standard deviations of the Fast Fourier Transformation of body-acceleration jerk in the Z-plane.

**55. f.Body.Gyro.X.Mean** The average of the means of the Fast Fourier Transformation of angular velocity in the X-plane.

**56. f.Body.Gyro.Y.Mean** The average of the means of the Fast Fourier Transformation of angular velocity in the Y-plane.

**57. f.Body.Gyro.Z.Mean** The average of the means of the Fast Fourier Transformation of angular velocity in the Z-plane.

**58. f.Body.Gyro.X.StdDev** The average of the standard deviations of the Fast Fourier Transformation of angular velocity in the X-plane.

**59. f.Body.Gyro.Y.StdDev** The average of the standard deviations of the Fast Fourier Transformation of angular velocity in the Y-plane.

**60. f.Body.Gyro.Z.StdDev** The average of the standard deviations of the Fast Fourier Transformation of angular velocity in the Z-plane.

**61. f.Body.Acc.Mag.Mean** The average of the means of the Fast Fourier Transformation of body-acceleration magnitude.

**62. f.Body.Acc.Mag.StdDev** The average of the standard deviations of the Fast Fourier Transformation of body-acceleration magnitude.

**63. f.Body.Acc.Jerk.Mag.Mean** The average of the means of the Fast Fourier Transformation of body-acceleration jerk magnitude.

**64. f.Body.Acc.Jerk.Mag.StdDev** The average of the standard deviations of the Fast Fourier Transformation of body-acceleration jerk magnitude.

**65. f.Body.Gyro.Mag.Mean** The average of the means of the Fast Fourier Transformation of angular velocity magnitude.

**66. f.Body.Gyro.Mag.StdDev** The average of the standard deviations of the Fast Fourier Transformation of angular velocity magnitude.

**67. f.Body.Gyro.Jerk.Mag.Mean** The average of the means of the Fast Fourier Transformation of angular velocity jerk magnitude.

**68. f.Body.Gyro.Jerk.Mag.StdDev** The average of the standard deviations of the Fast Fourier Transformation of angular velocity jerk magnitude.