

Getting and Cleaning Data: Course Project Code Book

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Study Design

The experiments have been carried out with a group of 30 volunteers within an age bracket of 19-48 years. Each person performed six activities (WALKING, WALKING_UPSTAIRS, WALKING_DOWNSTAIRS, SITTING, STANDING, LAYING) wearing a smartphone (Samsung Galaxy S II) on the waist. Using its embedded accelerometer and gyroscope, we 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, where 70% of the volunteers was selected for generating the training data and 30% 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/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 domain.

Summary

The test and train datasets were combined and only features that were measurements of the mean or standard deviation were extracted. The final data set contains the mean of each of these extracted features summarized by member and activity.

Code Book

Variable|Data Type|Units

1. subject|integer|subject id
2. activity|string|english name of activity
3. tBodyAcc-mean()-X|double|normalized (-1,1)
4. tBodyAcc-mean()-Y|double|normalized (-1,1)
5. tBodyAcc-mean()-Z|double|normalized (-1,1)
6. tBodyAcc-std()-X|double|normalized (-1,1)
7. tBodyAcc-std()-Y|double|normalized (-1,1)
8. tBodyAcc-std()-Z|double|normalized (-1,1)
9. tGravityAcc-mean()-X|double|normalized (-1,1)
10. tGravityAcc-mean()-Y|double|normalized (-1,1)
11. tGravityAcc-mean()-Z|double|normalized (-1,1)
12. tGravityAcc-std()-X|double|normalized (-1,1)
13. tGravityAcc-std()-Y|double|normalized (-1,1)
14. tGravityAcc-std()-Z|double|normalized (-1,1)
15. tBodyAccJerk-mean()-X|double|normalized (-1,1)
16. tBodyAccJerk-mean()-Y|double|normalized (-1,1)
17. tBodyAccJerk-mean()-Z|double|normalized (-1,1)

18. tBodyAccJerk-std()-X|double|normalized (-1,1)
19. tBodyAccJerk-std()-Y|double|normalized (-1,1)
20. tBodyAccJerk-std()-Z|double|normalized (-1,1)
21. tBodyGyro-mean()-X|double|normalized (-1,1)
22. tBodyGyro-mean()-Y|double|normalized (-1,1)
23. tBodyGyro-mean()-Z|double|normalized (-1,1)
24. tBodyGyro-std()-X|double|normalized (-1,1)
25. tBodyGyro-std()-Y|double|normalized (-1,1)
26. tBodyGyro-std()-Z|double|normalized (-1,1)
27. tBodyGyroJerk-mean()-X|double|normalized (-1,1)
28. tBodyGyroJerk-mean()-Y|double|normalized (-1,1)
29. tBodyGyroJerk-mean()-Z|double|normalized (-1,1)
30. tBodyGyroJerk-std()-X|double|normalized (-1,1)
31. tBodyGyroJerk-std()-Y|double|normalized (-1,1)
32. tBodyGyroJerk-std()-Z|double|normalized (-1,1)
33. tBodyAccMag-mean()|double|normalized (-1,1)
34. tBodyAccMag-std()|double|normalized (-1,1)
35. tGravityAccMag-mean()|double|normalized (-1,1)
36. tGravityAccMag-std()|double|normalized (-1,1)
37. tBodyAccJerkMag-mean()|double|normalized (-1,1)
38. tBodyAccJerkMag-std()|double|normalized (-1,1)
39. tBodyGyroMag-mean()|double|normalized (-1,1)
40. tBodyGyroMag-std()|double|normalized (-1,1)
41. tBodyGyroJerkMag-mean()|double|normalized (-1,1)
42. tBodyGyroJerkMag-std()|double|normalized (-1,1)
43. fBodyAcc-mean()-X|double|normalized (-1,1)
44. fBodyAcc-mean()-Y|double|normalized (-1,1)
45. fBodyAcc-mean()-Z|double|normalized (-1,1)
46. fBodyAcc-std()-X|double|normalized (-1,1)
47. fBodyAcc-std()-Y|double|normalized (-1,1)
48. fBodyAcc-std()-Z|double|normalized (-1,1)
49. fBodyAccJerk-mean()-X|double|normalized (-1,1)
50. fBodyAccJerk-mean()-Y|double|normalized (-1,1)
51. fBodyAccJerk-mean()-Z|double|normalized (-1,1)
52. fBodyAccJerk-std()-X|double|normalized (-1,1)
53. fBodyAccJerk-std()-Y|double|normalized (-1,1)
54. fBodyAccJerk-std()-Z|double|normalized (-1,1)
55. fBodyGyro-mean()-X|double|normalized (-1,1)
56. fBodyGyro-mean()-Y|double|normalized (-1,1)
57. fBodyGyro-mean()-Z|double|normalized (-1,1)
58. fBodyGyro-std()-X|double|normalized (-1,1)
59. fBodyGyro-std()-Y|double|normalized (-1,1)
60. fBodyGyro-std()-Z|double|normalized (-1,1)
61. fBodyAccMag-mean()|double|normalized (-1,1)
62. fBodyAccMag-std()|double|normalized (-1,1)
63. fBodyBodyAccJerkMag-mean()|double|normalized (-1,1)
64. fBodyBodyAccJerkMag-std()|double|normalized (-1,1)
65. fBodyBodyGyroMag-mean()|double|normalized (-1,1)
66. fBodyBodyGyroMag-std()|double|normalized (-1,1)
67. fBodyBodyGyroJerkMag-mean()|double|normalized (-1,1)

68. fBodyBodyGyroJerkMag-std()|double|normalized (-1,1)