CodeBook

The features in this database come from Human Activity Recognition Using Smartphones Dataset, Version 1.0, prepared by Reyes-Ortiz, Anguita, Ghio, and Oneto At the university degli Studi di Genova.

First I will briefly discuss the original experiments and resulting dataset. A group of 30 volunteers, ages 19-48, performed six activities: WALKING, WALKING\_UPSTAIRS, WALKING\_DOWNSTAIRS, SITTING, STANDING and LAYING, while wearing a Smartphone. The sensor signals from the accelerometer and gyroscope were preprocessed extensively through several filters, and separated into components. A set of vectors was obtained with time and frequency domains, indicated by the prefix ‘t’ for time and ‘f’ for frequency. The different measures were also broken up into their X, Y, and Z components. Lastly, a set of variables was calculated from these numbers, including mean, standard deviation, median absolute deviation, maximum, minimum, signal magnitude area, energy and many other statistics.

In preparing this dataset, we are only interested in mean and standard deviation measurements, which have been extracted from the original dataset. The choice was made to include any measures that have either “mean” or “std” as part of the variable name.

In the following list of variables, the prefix ‘t’ refers to measures over time, and ‘f’ for frequency. The variables are defined as follows:

Time statistics

1 tBodyAccMeanX body acceleration, X, mean

2 tBodyAccMeanY body acceleration, Y, mean

3 tBodyAccMeanZ body acceleration, Z, mean

4 tBodyAccStdX body acceleration, X, std. dev.

5 tBodyAccStdY body acceleration, Y, std. dev.

6 tBodyAccStdZ body acceleration, Z, std. dev.

7 tGravityAccMeanX gravity acceleration, X, mean

8 tGravityAccMeanY gravity acceleration, Y, mean

9 tGravityAccMeanZ gravity acceleration, Z, mean

10 tGravityAccStdX gravity acceleration, X, std. dev.

11 tGravityAccStdY gravity acceleration, Y, std. dev.

12 tGravityAccStdZ gravity acceleration, Z, std. dev.

13 tBodyAccJerkMeanX body acceleration jerk, X, mean

14 tBodyAccJerkMeanY body acceleration jerk, Y, mean

15 tBodyAccJerkMeanZ body acceleration jerk, Z, mean

16 tBodyAccJerkStdX body acceleration jerk, X, std.dev.

17 tBodyAccJerkStdY body acceleration jerk, Y, std.dev.

18 tBodyAccJerkStdZ body acceleration jerk, Z, std.dev.

19 tBodyGyroMeanX body gyro jerk, X, mean

20 tBodyGyroMeanY body gyro jerk, Y, mean

21 tBodyGyroMeanZ body gyro jerk, Z, mean

22 tBodyGyroStdX body gyro jerk, X, std.dev

23 tBodyGyroStdY body gyro jerk, Y, std.dev

24 tBodyGyroStdZ body gyro jerk, Z, std.dev

25 tBodyGyroJerkMeanX body gyro jerk, X, mean

26 tBodyGyroJerkMeanY body gyro jerk, Y, mean

27 tBodyGyroJerkMeanZ body gyro jerk, Z, mean

28 tBodyGyroJerkStdX body gyro jerk, X, std.dev.

29 tBodyGyroJerkStdY body gyro jerk, Y, std.dev.

30 tBodyGyroJerkStdZ body gyro jerk, Z, std.dev.

31 tBodyAccMagMean body acceleration magnitude, mean

32 tBodyAccMagStd body acceleration magnitude, std.dev

33 tGravityAccMagMean gravity acceleration magnitude, mean

34 tGravityAccMagStd gravity acceleration magnitude, std.dev

35 tBodyAccJerkMagMean body acceleration jerk magnitude, mean

36 tBodyAccJerkMagStd body acceleration jerk magnitude, std.dev

37 tBodyGyroMagMean body gyro magnitude, mean

38 tBodyGyroMagStd body gyro magnitude, std.dev

39 tBodyGyroJerkMagMean body gyro jerk magnitude, mean

40 tBodyGyroJerkMagStd body gyro jerk magnitude, std.dev.

Frequency statistics

41 fBodyAccMeanX body acceleration, X, mean

42 fBodyAccMeanY body acceleration, Y, mean

43 fBodyAccMeanZ body acceleration, X, mean

44 fBodyAccStdX body acceleration, X, std.dev.

45 fBodyAccStdY body acceleration, Y, std.dev.

46 fBodyAccStdZ body acceleration, Z, std.dev.

47 fBodyAccMeanFreqX body acceleration frequency, X, mean

48 fBodyAccMeanFreqY body acceleration frequency, Y, mean

49 fBodyAccMeanFreqZ body acceleration frequency, Z, mean

50 fBodyAccJerkMeanX body acceleration jerk, X, mean

51 fBodyAccJerkMeanY body acceleration jerk, Y, mean

52 fBodyAccJerkMeanZ body acceleration jerk, Z, mean

53 fBodyAccJerkStdX body acceleration jerk, X, std.dev.

54 fBodyAccJerkStdY body acceleration jerk, Y, std.dev.

55 fBodyAccJerkStdZ body acceleration jerk, Z, std.dev.

56 fBodyAccJerkMeanFreqX body acceleration jerk frequency, X, mean

57 fBodyAccJerkMeanFreqY body acceleration jerk frequency, Y, mean

58 fBodyAccJerkMeanFreqZ body acceleration jerk frequency, Z, mean

59 fBodyGyroMeanX body gyro, X, mean

60 fBodyGyroMeanY body gyro, Y, mean

61 fBodyGyroMeanZ body gyro, Z, mean

62 fBodyGyroStdX body gyro, X, std.dev.

63 fBodyGyroStdY body gyro, Y, std.dev.

64 fBodyGyroStdZ body gyro, Z, std.dev.

65 fBodyGyroMeanFreqX body gyro freq, X, mean

66 fBodyGyroMeanFreqY body gyro freq, Y, mean

67 fBodyGyroMeanFreqZ body gyro freq, Z, mean

68 fBodyAccMagMean body acceleration magnitude, mean

69 fBodyAccMagStd body acceleration magnitude, std.dev.

70 fBodyAccMagMeanFreq body acceleration magnitude frequency, mean

71 fBodyBodyAccJerkMagMean body body acceleration magnitude frequency, mean

72 fBodyBodyAccJerkMagStd body body acceleration magnitude frequency, std.dev

73 fBodyBodyAccJerkMagMeanFreq body body acceleration jerk magnitude frequency, mean

74 fBodyBodyGyroMagMean body body gyro magnitude, mean

75 fBodyBodyGyroMagStd body body gyro magnitude, std.dev

76 fBodyBodyGyroMagMeanFreq body body gyro magnitude frequency, mean

77 fBodyBodyGyroJerkMagMean body body gyro jerk magnitude, mean

78 fBodyBodyGyroJerkMagStd body body gyro jerk magnitude, std.dev

79 fBodyBodyGyroJerkMagMeanFreq body body gyro jerk magnitude frequency, mean

The final calculation was obtained by grouping the measurements for a user and the set of 6 activities, and doing the calculations for the mean of the values so grouped.