

Code Book Project

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Description of the steps

The assignment_fProject.R script performs the data preparation and then followed by the 5 steps required as described in the course project's definition.

1. Download the dataset

- Dataset downloaded and extracted under the folder called UCI HAR Dataset

2. Assign each data to variables

- features <- features.txt : 561 rows, 2 columns
- The features selected for this database come from the accelerometer and gyroscope 3-axial raw signals tAcc-XYZ and tGyro-XYZ.
- activities <- activity_labels.txt : 6 rows, 2 columns
- List of activities performed when the corresponding measurements were taken and its codes (labels)
- subject_test <- test/subject_test.txt : 2947 rows, 1 column contains test data of 9/30 volunteer test subjects being observed
- x_test <- test/X_test.txt : 2947 rows, 561 columns contains recorded features test data
- y_test <- test/y_test.txt : 2947 rows, 1 columns contains test data of activities'code labels
- subject_train <- test/subject_train.txt : 7352 rows, 1 column contains train data of 21/30 volunteer subjects being observed
- x_train <- test/X_train.txt : 7352 rows, 561 columns contains recorded features train data
- y_train <- test/y_train.txt : 7352 rows, 1 columns contains train data of activities'code labels

3. Merges the training and the test sets to create one data set

- X (10299 rows, 561 columns) is created by merging x_train and x_test using rbind() function
- Y (10299 rows, 1 column) is created by merging y_train and y_test using rbind() function
- Subject (10299 rows, 1 column) is created by merging subject_train and subject_test using rbind() function
- Merged_Data (10299 rows, 563 column) is created by merging Subject, Y and X using cbind() function

4. Extracts only the measurements on the mean and standard deviation for each measurement

- TidyData (10299 rows, 88 columns) is created by subsetting Merged_Data, selecting only columns: subject, code and the measurements on the mean and standard deviation (std) for each measurement

5. Uses descriptive activity names to name the activities in the data set

- Entire numbers in code column of the TidyData replaced with corresponding activity taken from second column of the activities variable

6. Appropriately labels the data set with descriptive variable names

- Code column in TidyData renamed into activities
- All Acc in column's name replaced by Accelerometer

- All Gyro in column's name replaced by Gyroscope
 - All BodyBody in column's name replaced by Body
 - All Mag in column's name replaced by Magnitude
 - All start with character f in column's name replaced by Frequency
 - All start with character t in column's name replaced by Time
7. From the data set in step 4, creates a second, independent tidy data set with the average of each variable for each activity and each subject
- FinalData (180 rows, 88 columns) is created by summarizing TidyData taking the means of each variable for each activity and each subject, after grouped by subject and activity.
 - Export FinalData into FinalData.txt file.

Description of the Final data

```
FinalData <- read.table("FinalData.txt", header = TRUE)
str(FinalData)
```

```
## 'data.frame': 180 obs. of 88 variables:
## $ subject : int 1 1 1 1 1 1 2 2 2 2 ...
## $ activity : chr "LAYING" "SITTING" "STANDING" "WALKING"
## $ TimeBodyAccelerometer.mean...X : num 0.222 0.261 0.279 0.277 0.289 ...
## $ TimeBodyAccelerometer.mean...Y : num -0.04051 -0.00131 -0.01614 -0.01738 -0.01738 ...
## $ TimeBodyAccelerometer.mean...Z : num -0.113 -0.105 -0.111 -0.111 -0.108 ...
## $ TimeGravityAccelerometer.mean...X : num -0.249 0.832 0.943 0.935 0.932 ...
## $ TimeGravityAccelerometer.mean...Y : num 0.706 0.204 -0.273 -0.282 -0.267 ...
## $ TimeGravityAccelerometer.mean...Z : num 0.4458 0.332 0.0135 -0.0681 -0.0621 ...
## $ TimeBodyAccelerometerJerk.mean...X : num 0.0811 0.0775 0.0754 0.074 0.0542 ...
## $ TimeBodyAccelerometerJerk.mean...Y : num 0.003838 -0.000619 0.007976 0.028272 0.028272 ...
## $ TimeBodyAccelerometerJerk.mean...Z : num 0.01083 -0.00337 -0.00369 -0.00417 -0.00417 ...
## $ TimeBodyGyroscope.mean...X : num -0.0166 -0.0454 -0.024 -0.0418 -0.0351 ...
## $ TimeBodyGyroscope.mean...Y : num -0.0645 -0.0919 -0.0594 -0.0695 -0.0909 ...
## $ TimeBodyGyroscope.mean...Z : num 0.1487 0.0629 0.0748 0.0849 0.0901 ...
## $ TimeBodyGyroscopeJerk.mean...X : num -0.1073 -0.0937 -0.0996 -0.09 -0.074 ...
## $ TimeBodyGyroscopeJerk.mean...Y : num -0.0415 -0.0402 -0.0441 -0.0398 -0.044 ...
## $ TimeBodyGyroscopeJerk.mean...Z : num -0.0741 -0.0467 -0.049 -0.0461 -0.027 ...
## $ TimeBodyAccelerometerMagnitude.mean... : num -0.8419 -0.9485 -0.9843 -0.137 0.0272 ...
## $ TimeGravityAccelerometerMagnitude.mean... : num -0.8419 -0.9485 -0.9843 -0.137 0.0272 ...
## $ TimeBodyAccelerometerJerkMagnitude.mean... : num -0.9544 -0.9874 -0.9924 -0.1414 -0.0894 ...
## $ TimeBodyGyroscopeMagnitude.mean... : num -0.8748 -0.9309 -0.9765 -0.161 -0.0757 ...
## $ TimeBodyGyroscopeJerkMagnitude.mean... : num -0.963 -0.992 -0.995 -0.299 -0.295 ...
## $ FrequencyBodyAccelerometer.mean...X : num -0.9391 -0.9796 -0.9952 -0.2028 0.0382 ...
## $ FrequencyBodyAccelerometer.mean...Y : num -0.86707 -0.94408 -0.97707 0.08971 0.00107 ...
## $ FrequencyBodyAccelerometer.mean...Z : num -0.883 -0.959 -0.985 -0.332 -0.226 ...
## $ FrequencyBodyAccelerometer.meanFreq...X : num -0.1588 -0.0495 0.0865 -0.2075 -0.3074 ...
## $ FrequencyBodyAccelerometer.meanFreq...Y : num 0.0975 0.0759 0.1175 0.1131 0.0632 ...
## $ FrequencyBodyAccelerometer.meanFreq...Z : num 0.0894 0.2388 0.2449 0.0497 0.2943 ...
## $ FrequencyBodyAccelerometerJerk.mean...X : num -0.9571 -0.9866 -0.9946 -0.1705 -0.0277 ...
## $ FrequencyBodyAccelerometerJerk.mean...Y : num -0.9225 -0.9816 -0.9854 -0.0352 -0.1287 ...
## $ FrequencyBodyAccelerometerJerk.mean...Z : num -0.948 -0.986 -0.991 -0.469 -0.288 ...
## $ FrequencyBodyAccelerometerJerk.meanFreq...X : num 0.132 0.257 0.314 -0.209 -0.253 ...
## $ FrequencyBodyAccelerometerJerk.meanFreq...Y : num 0.0245 0.0475 0.0392 -0.3862 -0.3376 ...
## $ FrequencyBodyAccelerometerJerk.meanFreq...Z : num 0.02439 0.09239 0.13858 -0.18553 0.00937 ...
## $ FrequencyBodyGyroscope.mean...X : num -0.85 -0.976 -0.986 -0.339 -0.352 ...
## $ FrequencyBodyGyroscope.mean...Y : num -0.9522 -0.9758 -0.989 -0.1031 -0.0557 ...
```

```

## $ FrequencyBodyGyroscope.mean...Z : num -0.9093 -0.9513 -0.9808 -0.2559 -0.0319
## $ FrequencyBodyGyroscope.meanFreq...X : num -0.00355 0.18915 -0.12029 0.01478 -0.100
## $ FrequencyBodyGyroscope.meanFreq...Y : num -0.0915 0.0631 -0.0447 -0.0658 0.0826 ..
## $ FrequencyBodyGyroscope.meanFreq...Z : num 0.010458 -0.029784 0.100608 0.000773 -0.
## $ FrequencyBodyAccelerometerMagnitude.mean.. : num -0.8618 -0.9478 -0.9854 -0.1286 0.0966 .
## $ FrequencyBodyAccelerometerMagnitude.meanFreq.. : num 0.0864 0.2367 0.2846 0.1906 0.1192 ...
## $ FrequencyBodyAccelerometerJerkMagnitude.mean.. : num -0.9333 -0.9853 -0.9925 -0.0571 0.0262 ..
## $ FrequencyBodyAccelerometerJerkMagnitude.meanFreq.. : num 0.2664 0.3519 0.4222 0.0938 0.0765 ...
## $ FrequencyBodyGyroscopeMagnitude.mean.. : num -0.862 -0.958 -0.985 -0.199 -0.186 ...
## $ FrequencyBodyGyroscopeMagnitude.meanFreq.. : num -0.139775 -0.000262 -0.028606 0.268844 0
## $ FrequencyBodyGyroscopeJerkMagnitude.mean.. : num -0.942 -0.99 -0.995 -0.319 -0.282 ...
## $ FrequencyBodyGyroscopeJerkMagnitude.meanFreq.. : num 0.176 0.185 0.334 0.191 0.19 ...
## $ Angle.TimeBodyAccelerometerMean.Gravity. : num 0.021366 0.027442 -0.000222 0.060454 -0.
## $ Angle.TimeBodyAccelerometerJerkMean..GravityMean. : num 0.00306 0.02971 0.02196 -0.00793 0.08993
## $ Angle.TimeBodyGyroscopeMean.GravityMean. : num -0.00167 0.0677 -0.03379 0.01306 0.06334
## $ Angle.TimeBodyGyroscopeJerkMean.GravityMean. : num 0.0844 -0.0649 -0.0279 -0.0187 -0.04 ...
## $ Angle.X.GravityMean. : num 0.427 -0.591 -0.743 -0.729 -0.744 ...
## $ Angle.Y.GravityMean. : num -0.5203 -0.0605 0.2702 0.277 0.2672 ...
## $ Angle.Z.GravityMean. : num -0.3524 -0.218 0.0123 0.0689 0.065 ...
## $ TimeBodyAccelerometer.std...X : num -0.928 -0.977 -0.996 -0.284 0.03 ...
## $ TimeBodyAccelerometer.std...Y : num -0.8368 -0.9226 -0.9732 0.1145 -0.0319 .
## $ TimeBodyAccelerometer.std...Z : num -0.826 -0.94 -0.98 -0.26 -0.23 ...
## $ TimeGravityAccelerometer.std...X : num -0.897 -0.968 -0.994 -0.977 -0.951 ...
## $ TimeGravityAccelerometer.std...Y : num -0.908 -0.936 -0.981 -0.971 -0.937 ...
## $ TimeGravityAccelerometer.std...Z : num -0.852 -0.949 -0.976 -0.948 -0.896 ...
## $ TimeBodyAccelerometerJerk.std...X : num -0.9585 -0.9864 -0.9946 -0.1136 -0.0123
## $ TimeBodyAccelerometerJerk.std...Y : num -0.924 -0.981 -0.986 0.067 -0.102 ...
## $ TimeBodyAccelerometerJerk.std...Z : num -0.955 -0.988 -0.992 -0.503 -0.346 ...
## $ TimeBodyGyroscope.std...X : num -0.874 -0.977 -0.987 -0.474 -0.458 ...
## $ TimeBodyGyroscope.std...Y : num -0.9511 -0.9665 -0.9877 -0.0546 -0.1263
## $ TimeBodyGyroscope.std...Z : num -0.908 -0.941 -0.981 -0.344 -0.125 ...
## $ TimeBodyGyroscopeJerk.std...X : num -0.919 -0.992 -0.993 -0.207 -0.487 ...
## $ TimeBodyGyroscopeJerk.std...Y : num -0.968 -0.99 -0.995 -0.304 -0.239 ...
## $ TimeBodyGyroscopeJerk.std...Z : num -0.958 -0.988 -0.992 -0.404 -0.269 ...
## $ TimeBodyAccelerometerMagnitude.std.. : num -0.7951 -0.9271 -0.9819 -0.2197 0.0199 .
## $ TimeGravityAccelerometerMagnitude.std.. : num -0.7951 -0.9271 -0.9819 -0.2197 0.0199 .
## $ TimeBodyAccelerometerJerkMagnitude.std.. : num -0.9282 -0.9841 -0.9931 -0.0745 -0.0258
## $ TimeBodyGyroscopeMagnitude.std.. : num -0.819 -0.935 -0.979 -0.187 -0.226 ...
## $ TimeBodyGyroscopeJerkMagnitude.std.. : num -0.936 -0.988 -0.995 -0.325 -0.307 ...
## $ FrequencyBodyAccelerometer.std...X : num -0.9244 -0.9764 -0.996 -0.3191 0.0243 ..
## $ FrequencyBodyAccelerometer.std...Y : num -0.834 -0.917 -0.972 0.056 -0.113 ...
## $ FrequencyBodyAccelerometer.std...Z : num -0.813 -0.934 -0.978 -0.28 -0.298 ...
## $ FrequencyBodyAccelerometerJerk.std...X : num -0.9642 -0.9875 -0.9951 -0.1336 -0.0863
## $ FrequencyBodyAccelerometerJerk.std...Y : num -0.932 -0.983 -0.987 0.107 -0.135 ...
## $ FrequencyBodyAccelerometerJerk.std...Z : num -0.961 -0.988 -0.992 -0.535 -0.402 ...
## $ FrequencyBodyGyroscope.std...X : num -0.882 -0.978 -0.987 -0.517 -0.495 ...
## $ FrequencyBodyGyroscope.std...Y : num -0.9512 -0.9623 -0.9871 -0.0335 -0.1814
## $ FrequencyBodyGyroscope.std...Z : num -0.917 -0.944 -0.982 -0.437 -0.238 ...
## $ FrequencyBodyAccelerometerMagnitude.std.. : num -0.798 -0.928 -0.982 -0.398 -0.187 ...
## $ FrequencyBodyAccelerometerJerkMagnitude.std.. : num -0.922 -0.982 -0.993 -0.103 -0.104 ...
## $ FrequencyBodyGyroscopeMagnitude.std.. : num -0.824 -0.932 -0.978 -0.321 -0.398 ...
## $ FrequencyBodyGyroscopeJerkMagnitude.std.. : num -0.933 -0.987 -0.995 -0.382 -0.392 ...

```