Course 3 Project Codebook for Course3ProjectTidyData.txt

The following data was derived from “features.txt”. The names were expanded in order to improve understandability. Because the original documentation was a little hard to follow, I can’t guarantee that the names are all correctly expanded. However, I have written my code so that you can simply edit this file and improve the expansions, and rerun run\_analysis.R to create a new Course3ProjectTidyData.txt with the new variable names.

The index column indicates the original index of the features.txt of the column name, so it is easy to cross reference the names

I broke the names up into meaningful groups in order to reduce the amount of redundant commenting that would be necessary. For example timeDomainBodyAcceleration\_Mean-X, -Y, -Z means you have one signal each fo the X, Y, and Z directions

Index ColumnName –

timeDomainBodyAcceleration\_Mean-X, -Y, \_-Z

The features selected for this database come from the accelerometer and gyroscope 3-axial raw signals tAcc-XYZ and tGyro-XYZ. These time domain signals were captured at a constant rate of 50 Hz. Then they were filtered using a median filter and a 3rd order low pass Butterworth filter with a corner frequency of 20 Hz to remove noise. The following are the mean and standard deviations of the Body Acceleration signals derived in this manner, using another low pass Butterworth filter with a corner frequency of 0.3 Hz.

1 timeDomainBodyAcceleration\_MeanX

2 timeDomainBodyAcceleration\_MeanY

3 timeDomainBodyAcceleration\_MeanZ

4 timeDomainBodyAcceleration\_stdX

5 timeDomainBodyAcceleration\_stdY

6 timeDomainBodyAcceleration\_stdZ

The following are the Gravity Acceleration signals derived in the same manner as signals 1-6

41 timeDomainGravityAcceleration\_MeanX

42 timeDomainGravityAcceleration\_MeanY

43 timeDomainGravityAcceleration\_MeanZ

44 timeDomainGravityAcceleration\_stdX

45 timeDomainGravityAcceleration\_stdY

46 timeDomainGravityAcceleration\_stdZ

The following are the mean and standard deviations of the body linear acceleration and angular velocity were derived in time to obtain Jerk signals

81 timeDomainBodyAcceleration\_JerkMeanX

82 timeDomainBodyAcceleration\_JerkMeanY

83 timeDomainBodyAcceleration\_JerkMeanZ

84 timeDomainBodyAcceleration\_JerkstdX

85 timeDomainBodyAcceleration\_JerkstdY

86 timeDomainBodyAcceleration\_JerkstdZ

121 timeDomainBodyGyroMeanX

122 timeDomainBodyGyroMeanY

123 timeDomainBodyGyroMeanZ

124 timeDomainBodyGyrostdX

125 timeDomainBodyGyrostdY

126 timeDomainBodyGyrostdZ

161 timeDomainBodyGyroJerkMeanX

162 timeDomainBodyGyroJerkMeanY

163 timeDomainBodyGyroJerkMeanZ

164 timeDomainBodyGyroJerkstdX

165 timeDomainBodyGyroJerkstdY

166 timeDomainBodyGyroJerkstdZ

The magnitude of the related three-dimensional signals that are refreed to in the first part of the name were calculated using the Euclidean norm, and then the mean was calculated. For example, the XYZ versions of timeDomainBodyAcceleration (which is not in the reduced data set) was used to calculate the Euclidean norm, and then the mean and standard deviation was calculated.

201 timeDomainBodyAcceleration\_MagnitudeMean

202 timeDomainBodyAcceleration\_Magnitudestd

The process used on signals 201 and 202 was used on timeDomainGravityAcceleration

214 timeDomainGravityAcceleration\_MagnitudeMean

215 timeDomainGravityAcceleration\_Magnitudestd

The process used on signals 201 and 202 was used on timeDomainBodyAcceleration\_Jerk

227 timeDomainBodyAcceleration\_JerkMagnitudeMean

228 timeDomainBodyAcceleration\_JerkMagnitudestd

The process used on signals 201 and 202 was used on

timeDomainBodyGyro

240 timeDomainBodyGyroMagnitudeMean

241 timeDomainBodyGyroMagnitudestd

The process used on signals 201 and 202 was used on

timeDomainBodyGyroJerk

253 timeDomainBodyGyroJerkMagnitudeMean

254 timeDomainBodyGyroJerkMagnitudestd

A Fast Fourier Transform (FFT) was applied to some of these signals as indicated by the base name producing the following means and standard deviations. For example 266 was produced by taking the mean of the result of FFTs applied to the timeBodyAcceleration.

266 FrequencyDomainBodyAcceleration\_MeanX

267 FrequencyDomainBodyAcceleration\_MeanY

268 FrequencyDomainBodyAcceleration\_MeanZ

Similar to the process used for signal 266, the following were produced by taking the standard deviation of the result of the FFTs applied to the FrequencyDomainBodyAcceleration

269 FrequencyDomainBodyAcceleration\_stdX

270 FrequencyDomainBodyAcceleration\_stdY

271 FrequencyDomainBodyAcceleration\_stdZ

The following were produced by taking the mean of the result of the FFTs applied to the FrequencyDomainBodyAcceleration and then using a weighted average of the frequency components to obtain a mean frequency

294 FrequencyDomainBodyAccelerationMeanFreqX

295 FrequencyDomainBodyAccelerationMeanFreqY

296 FrequencyDomainBodyAccelerationMeanFreqZ

Similar to the process used for signal 266, the following were produced by taking the mean of the result of the FFTs applied to the FrequencyDomainBodyAcceleration\_Jerk

345 FrequencyDomainBodyAcceleration\_JerkMeanX

346 FrequencyDomainBodyAcceleration\_JerkMeanY

347 FrequencyDomainBodyAcceleration\_JerkMeanZ

Similar to the process used for signal 269, the following were produced by taking the standard deviation of the result of the FFTs applied to the FrequencyDomainBodyAcceleration\_Jerk

348 FrequencyDomainBodyAcceleration\_JerkstdX

349 FrequencyDomainBodyAcceleration\_JerkstdY

350 FrequencyDomainBodyAcceleration\_JerkstdZ

Similar to the process used for signal 294, these signals were produced by taking the mean of the result of the FFTs applied to the FrequencyDomainBodyAcceleration\_Jerk

373 FrequencyDomainBodyAcceleration\_JerkMeanFreqX

374 FrequencyDomainBodyAcceleration\_JerkMeanFreqY

375 FrequencyDomainBodyAcceleration\_JerkMeanFreqZ

Similar to the process used for signal 266, the following were produced by taking the mean of the result of the FFTs applied to the FrequencyDomainBodyGyro

424 FrequencyDomainBodyGyroMeanX

425 FrequencyDomainBodyGyroMeanY

426 FrequencyDomainBodyGyroMeanZ

Similar to the process used for signal 269, the following were produced by taking the standard deviation of the result of the FFTs applied to the FrequencyDomainBodyGyro

427 FrequencyDomainBodyGyrostdX

428 FrequencyDomainBodyGyrostdY

429 FrequencyDomainBodyGyrostdZ

Similar to the process used for signal 294, these signals were produced by taking the mean of the result of the FFTs applied to the FrequencyDomainBodyGyro

452 FrequencyDomainBodyGyroMeanFreqX

453 FrequencyDomainBodyGyroMeanFreqY

454 FrequencyDomainBodyGyroMeanFreqZ

It was somewhat difficult to understand exactly where these signals came from, but by comparing the name to similar time domain samples, I concluded that the magnitude of the related three-dimensional signals that are refered to in the first part of the name were calculated using the Euclidean norm, and then the mean was calculated. For example, the XYZ versions of FrequencyDomainBodyAcceleration (which is not in the reduced data set) was used to calculate the Euclidean norm, and then the mean and standard deviation and mean frequency was calculated.

503 FrequencyDomainBodyAcceleration\_MagnitudeMean

504 FrequencyDomainBodyAcceleration\_Magnitudestd

513 FrequencyDomainBodyAcceleration\_MagnitudeMeanFreq

The process outlined for signal 503, 504 and 513 was used on the

Base signal FrequencyDomainBodyAcceleration\_Jerk to create the following 3 signals.

516 FrequencyDomainBodyAcceleration\_JerkMagnitudeMean

517 FrequencyDomainBodyAcceleration\_JerkMagnitudestd

526 FrequencyDomainBodyAcceleration\_JerkMagnitudeMeanFreq

The process outlined for signal 503, 504 and 513 was used on the

Base signal FrequencyDomainBodyGyro to create the following 3 signals.

529 FrequencyDomainBodyGyroMagnitudeMean

530 FrequencyDomainBodyGyroMagnitudestd

539 FrequencyDomainBodyGyroMagnitudeMeanFreq

The process outlined for signal 503, 504 and 513 was used on the

Base signal FrequencyDomainBodyGyroJerk to create the following 3 signals.

542 FrequencyDomainBodyGyroJerkMagnitudeMean

543 FrequencyDomainBodyGyroJerkMagnitudestd

552 FrequencyDomainBodyGyroJerkMagnitudeMeanFreq

562 Subjects – a number between 1 and 30 that indicates which subject the observation is related to

563 Activity – the index 1-6 of the activity. The actual activity names are store in the activity\_labels.txt. They are reproduced here for your convenience.

1 WALKING

2 WALKING\_UPSTAIRS

3 WALKING\_DOWNSTAIRS

4 SITTING

5 STANDING

6 LAYING