DATA DICTIONARY

Human Activity Recognition Using Smartphones Dataset

Version 1.0

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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. See 'features_info.txt' for more details.

For each record it is provided:

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- Triaxial acceleration from the accelerometer (total acceleration) and the estimated body acceleration.
- Triaxial Angular velocity from the gyroscope.
- A 561-feature vector with time and frequency domain variables.
- Its activity label.

- An identifier of the subject who carried out the experiment.

The dataset includes the following files:

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- 'README.txt'

- 'features_info.txt': Shows information about the variables used on the feature vector.

- 'features.txt': List of all features.

- 'activity_labels.txt': Links the class labels with their activity name.

- 'train/X_train.txt': Training set.

- 'train/y_train.txt': Training labels.

- 'test/X_test.txt': Test set.

- 'test/y_test.txt': Test labels.

The following files are available for the train and test data. Their descriptions are equivalent.

- 'train/subject_train.txt': Each row identifies the subject who performed the activity for each window sample. Its range is from 1 to 30.

- 'train/Inertial Signals/total_acc_x_train.txt': The acceleration signal from the smartphone accelerometer X axis in standard gravity units 'g'. Every row shows a 128 element vector. The same description applies for the 'total_acc_x_train.txt' and 'total_acc_z_train.txt' files for the Y and Z axis.

- 'train/Inertial Signals/body_acc_x_train.txt': The body acceleration signal obtained by subtracting the gravity from the total acceleration.

- 'train/Inertial Signals/body_gyro_x_train.txt': The angular velocity vector measured by the gyroscope for each window sample. The units are radians/second.

Notes:

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- Features are normalized and bounded within [-1,1].

- Each feature vector is a row on the text file.

activity_labels 6

activity_labels

1 WALKING

2 WALKING_UPSTAIRS

3 WALKING_DOWNSTAIRS

4 SITTING

5 STANDING

6 LAYING

Features 561

features

1 tBodyAcc-mean()-X

2 tBodyAcc-mean()-Y

3 tBodyAcc-mean()-Z

4 tBodyAcc-std()-X

5 tBodyAcc-std()-Y

6 tBodyAcc-std()-Z

7 tBodyAcc-mad()-X

8 tBodyAcc-mad()-Y

9 tBodyAcc-mad()-Z

10 tBodyAcc-max()-X

11 tBodyAcc-max()-Y

12 tBodyAcc-max()-Z

13 tBodyAcc-min()-X

14 tBodyAcc-min()-Y

15 tBodyAcc-min()-Z

16 tBodyAcc-sma()

17 tBodyAcc-energy()-X

18 tBodyAcc-energy()-Y

19 tBodyAcc-energy()-Z

20 tBodyAcc-iqr()-X

21 tBodyAcc-iqr()-Y

22 tBodyAcc-iqr()-Z

23 tBodyAcc-entropy()-X

24 tBodyAcc-entropy()-Y

25 tBodyAcc-entropy()-Z

26 tBodyAcc-arCoeff()-X,1

27 tBodyAcc-arCoeff()-X,2

28 tBodyAcc-arCoeff()-X,3

29 tBodyAcc-arCoeff()-X,4

30 tBodyAcc-arCoeff()-Y,1

31 tBodyAcc-arCoeff()-Y,2

32 tBodyAcc-arCoeff()-Y,3

33 tBodyAcc-arCoeff()-Y,4

34 tBodyAcc-arCoeff()-Z,1

35 tBodyAcc-arCoeff()-Z,2

36 tBodyAcc-arCoeff()-Z,3

37 tBodyAcc-arCoeff()-Z,4

38 tBodyAcc-correlation()-X,Y

39 tBodyAcc-correlation()-X,Z

40 tBodyAcc-correlation()-Y,Z

41 tGravityAcc-mean()-X

42 tGravityAcc-mean()-Y

43 tGravityAcc-mean()-Z

44 tGravityAcc-std()-X

45 tGravityAcc-std()-Y

46 tGravityAcc-std()-Z

47 tGravityAcc-mad()-X

48 tGravityAcc-mad()-Y

49 tGravityAcc-mad()-Z

50 tGravityAcc-max()-X

51 tGravityAcc-max()-Y

52 tGravityAcc-max()-Z

53 tGravityAcc-min()-X

54 tGravityAcc-min()-Y

55 tGravityAcc-min()-Z

56 tGravityAcc-sma()

57 tGravityAcc-energy()-X

58 tGravityAcc-energy()-Y

59 tGravityAcc-energy()-Z

60 tGravityAcc-iqr()-X

61 tGravityAcc-iqr()-Y

62 tGravityAcc-iqr()-Z

63 tGravityAcc-entropy()-X

64 tGravityAcc-entropy()-Y

65 tGravityAcc-entropy()-Z

66 tGravityAcc-arCoeff()-X,1

67 tGravityAcc-arCoeff()-X,2

68 tGravityAcc-arCoeff()-X,3

69 tGravityAcc-arCoeff()-X,4

70 tGravityAcc-arCoeff()-Y,1

71 tGravityAcc-arCoeff()-Y,2

72 tGravityAcc-arCoeff()-Y,3

73 tGravityAcc-arCoeff()-Y,4

74 tGravityAcc-arCoeff()-Z,1

75 tGravityAcc-arCoeff()-Z,2

76 tGravityAcc-arCoeff()-Z,3

77 tGravityAcc-arCoeff()-Z,4

78 tGravityAcc-correlation()-X,Y

79 tGravityAcc-correlation()-X,Z

80 tGravityAcc-correlation()-Y,Z

81 tBodyAccJerk-mean()-X

82 tBodyAccJerk-mean()-Y

83 tBodyAccJerk-mean()-Z

84 tBodyAccJerk-std()-X

85 tBodyAccJerk-std()-Y

86 tBodyAccJerk-std()-Z

87 tBodyAccJerk-mad()-X

88 tBodyAccJerk-mad()-Y

89 tBodyAccJerk-mad()-Z

90 tBodyAccJerk-max()-X

91 tBodyAccJerk-max()-Y

92 tBodyAccJerk-max()-Z

93 tBodyAccJerk-min()-X

94 tBodyAccJerk-min()-Y

95 tBodyAccJerk-min()-Z

96 tBodyAccJerk-sma()

97 tBodyAccJerk-energy()-X

98 tBodyAccJerk-energy()-Y

99 tBodyAccJerk-energy()-Z

100 tBodyAccJerk-iqr()-X

101 tBodyAccJerk-iqr()-Y

102 tBodyAccJerk-iqr()-Z

103 tBodyAccJerk-entropy()-X

104 tBodyAccJerk-entropy()-Y

105 tBodyAccJerk-entropy()-Z

106 tBodyAccJerk-arCoeff()-X,1

107 tBodyAccJerk-arCoeff()-X,2

108 tBodyAccJerk-arCoeff()-X,3

109 tBodyAccJerk-arCoeff()-X,4

110 tBodyAccJerk-arCoeff()-Y,1

111 tBodyAccJerk-arCoeff()-Y,2

112 tBodyAccJerk-arCoeff()-Y,3

113 tBodyAccJerk-arCoeff()-Y,4

114 tBodyAccJerk-arCoeff()-Z,1

115 tBodyAccJerk-arCoeff()-Z,2

116 tBodyAccJerk-arCoeff()-Z,3

117 tBodyAccJerk-arCoeff()-Z,4

118 tBodyAccJerk-correlation()-X,Y

119 tBodyAccJerk-correlation()-X,Z

120 tBodyAccJerk-correlation()-Y,Z

121 tBodyGyro-mean()-X

122 tBodyGyro-mean()-Y

123 tBodyGyro-mean()-Z

124 tBodyGyro-std()-X

125 tBodyGyro-std()-Y

126 tBodyGyro-std()-Z

127 tBodyGyro-mad()-X

128 tBodyGyro-mad()-Y

129 tBodyGyro-mad()-Z

130 tBodyGyro-max()-X

131 tBodyGyro-max()-Y

132 tBodyGyro-max()-Z

133 tBodyGyro-min()-X

134 tBodyGyro-min()-Y

135 tBodyGyro-min()-Z

136 tBodyGyro-sma()

137 tBodyGyro-energy()-X

138 tBodyGyro-energy()-Y

139 tBodyGyro-energy()-Z

140 tBodyGyro-iqr()-X

141 tBodyGyro-iqr()-Y

142 tBodyGyro-iqr()-Z

143 tBodyGyro-entropy()-X

144 tBodyGyro-entropy()-Y

145 tBodyGyro-entropy()-Z

146 tBodyGyro-arCoeff()-X,1

147 tBodyGyro-arCoeff()-X,2

148 tBodyGyro-arCoeff()-X,3

149 tBodyGyro-arCoeff()-X,4

150 tBodyGyro-arCoeff()-Y,1

151 tBodyGyro-arCoeff()-Y,2

152 tBodyGyro-arCoeff()-Y,3

153 tBodyGyro-arCoeff()-Y,4

154 tBodyGyro-arCoeff()-Z,1

155 tBodyGyro-arCoeff()-Z,2

156 tBodyGyro-arCoeff()-Z,3

157 tBodyGyro-arCoeff()-Z,4

158 tBodyGyro-correlation()-X,Y

159 tBodyGyro-correlation()-X,Z

160 tBodyGyro-correlation()-Y,Z

161 tBodyGyroJerk-mean()-X

162 tBodyGyroJerk-mean()-Y

163 tBodyGyroJerk-mean()-Z

164 tBodyGyroJerk-std()-X

165 tBodyGyroJerk-std()-Y

166 tBodyGyroJerk-std()-Z

167 tBodyGyroJerk-mad()-X

168 tBodyGyroJerk-mad()-Y

169 tBodyGyroJerk-mad()-Z

170 tBodyGyroJerk-max()-X

171 tBodyGyroJerk-max()-Y

172 tBodyGyroJerk-max()-Z

173 tBodyGyroJerk-min()-X

174 tBodyGyroJerk-min()-Y

175 tBodyGyroJerk-min()-Z

176 tBodyGyroJerk-sma()

177 tBodyGyroJerk-energy()-X

178 tBodyGyroJerk-energy()-Y

179 tBodyGyroJerk-energy()-Z

180 tBodyGyroJerk-iqr()-X

181 tBodyGyroJerk-iqr()-Y

182 tBodyGyroJerk-iqr()-Z

183 tBodyGyroJerk-entropy()-X

184 tBodyGyroJerk-entropy()-Y

185 tBodyGyroJerk-entropy()-Z

186 tBodyGyroJerk-arCoeff()-X,1

187 tBodyGyroJerk-arCoeff()-X,2

188 tBodyGyroJerk-arCoeff()-X,3

189 tBodyGyroJerk-arCoeff()-X,4

190 tBodyGyroJerk-arCoeff()-Y,1

191 tBodyGyroJerk-arCoeff()-Y,2

192 tBodyGyroJerk-arCoeff()-Y,3

193 tBodyGyroJerk-arCoeff()-Y,4

194 tBodyGyroJerk-arCoeff()-Z,1

195 tBodyGyroJerk-arCoeff()-Z,2

196 tBodyGyroJerk-arCoeff()-Z,3

197 tBodyGyroJerk-arCoeff()-Z,4

198 tBodyGyroJerk-correlation()-X,Y

199 tBodyGyroJerk-correlation()-X,Z

200 tBodyGyroJerk-correlation()-Y,Z

201 tBodyAccMag-mean()

202 tBodyAccMag-std()

203 tBodyAccMag-mad()

204 tBodyAccMag-max()

205 tBodyAccMag-min()

206 tBodyAccMag-sma()

207 tBodyAccMag-energy()

208 tBodyAccMag-iqr()

209 tBodyAccMag-entropy()

210 tBodyAccMag-arCoeff()1

211 tBodyAccMag-arCoeff()2

212 tBodyAccMag-arCoeff()3

213 tBodyAccMag-arCoeff()4

214 tGravityAccMag-mean()

215 tGravityAccMag-std()

216 tGravityAccMag-mad()

217 tGravityAccMag-max()

218 tGravityAccMag-min()

219 tGravityAccMag-sma()

220 tGravityAccMag-energy()

221 tGravityAccMag-iqr()

222 tGravityAccMag-entropy()

223 tGravityAccMag-arCoeff()1

224 tGravityAccMag-arCoeff()2

225 tGravityAccMag-arCoeff()3

226 tGravityAccMag-arCoeff()4

227 tBodyAccJerkMag-mean()

228 tBodyAccJerkMag-std()

229 tBodyAccJerkMag-mad()

230 tBodyAccJerkMag-max()

231 tBodyAccJerkMag-min()

232 tBodyAccJerkMag-sma()

233 tBodyAccJerkMag-energy()

234 tBodyAccJerkMag-iqr()

235 tBodyAccJerkMag-entropy()

236 tBodyAccJerkMag-arCoeff()1

237 tBodyAccJerkMag-arCoeff()2

238 tBodyAccJerkMag-arCoeff()3

239 tBodyAccJerkMag-arCoeff()4

240 tBodyGyroMag-mean()

241 tBodyGyroMag-std()

242 tBodyGyroMag-mad()

243 tBodyGyroMag-max()

244 tBodyGyroMag-min()

245 tBodyGyroMag-sma()

246 tBodyGyroMag-energy()

247 tBodyGyroMag-iqr()

248 tBodyGyroMag-entropy()

249 tBodyGyroMag-arCoeff()1

250 tBodyGyroMag-arCoeff()2

251 tBodyGyroMag-arCoeff()3

252 tBodyGyroMag-arCoeff()4

253 tBodyGyroJerkMag-mean()

254 tBodyGyroJerkMag-std()

255 tBodyGyroJerkMag-mad()

256 tBodyGyroJerkMag-max()

257 tBodyGyroJerkMag-min()

258 tBodyGyroJerkMag-sma()

259 tBodyGyroJerkMag-energy()

260 tBodyGyroJerkMag-iqr()

261 tBodyGyroJerkMag-entropy()

262 tBodyGyroJerkMag-arCoeff()1

263 tBodyGyroJerkMag-arCoeff()2

264 tBodyGyroJerkMag-arCoeff()3

265 tBodyGyroJerkMag-arCoeff()4

266 fBodyAcc-mean()-X

267 fBodyAcc-mean()-Y

268 fBodyAcc-mean()-Z

269 fBodyAcc-std()-X

270 fBodyAcc-std()-Y

271 fBodyAcc-std()-Z

272 fBodyAcc-mad()-X

273 fBodyAcc-mad()-Y

274 fBodyAcc-mad()-Z

275 fBodyAcc-max()-X

276 fBodyAcc-max()-Y

277 fBodyAcc-max()-Z

278 fBodyAcc-min()-X

279 fBodyAcc-min()-Y

280 fBodyAcc-min()-Z

281 fBodyAcc-sma()

282 fBodyAcc-energy()-X

283 fBodyAcc-energy()-Y

284 fBodyAcc-energy()-Z

285 fBodyAcc-iqr()-X

286 fBodyAcc-iqr()-Y

287 fBodyAcc-iqr()-Z

288 fBodyAcc-entropy()-X

289 fBodyAcc-entropy()-Y

290 fBodyAcc-entropy()-Z

291 fBodyAcc-maxInds-X

292 fBodyAcc-maxInds-Y

293 fBodyAcc-maxInds-Z

294 fBodyAcc-meanFreq()-X

295 fBodyAcc-meanFreq()-Y

296 fBodyAcc-meanFreq()-Z

297 fBodyAcc-skewness()-X

298 fBodyAcc-kurtosis()-X

299 fBodyAcc-skewness()-Y

300 fBodyAcc-kurtosis()-Y

301 fBodyAcc-skewness()-Z

302 fBodyAcc-kurtosis()-Z

303 fBodyAcc-bandsEnergy()-1,8

304 fBodyAcc-bandsEnergy()-9,16

305 fBodyAcc-bandsEnergy()-17,24

306 fBodyAcc-bandsEnergy()-25,32

307 fBodyAcc-bandsEnergy()-33,40

308 fBodyAcc-bandsEnergy()-41,48

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330 fBodyAcc-bandsEnergy()-25,48

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336 fBodyAcc-bandsEnergy()-41,48

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341 fBodyAcc-bandsEnergy()-33,48

342 fBodyAcc-bandsEnergy()-49,64

343 fBodyAcc-bandsEnergy()-1,24

344 fBodyAcc-bandsEnergy()-25,48

345 fBodyAccJerk-mean()-X

346 fBodyAccJerk-mean()-Y

347 fBodyAccJerk-mean()-Z

348 fBodyAccJerk-std()-X

349 fBodyAccJerk-std()-Y

350 fBodyAccJerk-std()-Z

351 fBodyAccJerk-mad()-X

352 fBodyAccJerk-mad()-Y

353 fBodyAccJerk-mad()-Z

354 fBodyAccJerk-max()-X

355 fBodyAccJerk-max()-Y

356 fBodyAccJerk-max()-Z

357 fBodyAccJerk-min()-X

358 fBodyAccJerk-min()-Y

359 fBodyAccJerk-min()-Z

360 fBodyAccJerk-sma()

361 fBodyAccJerk-energy()-X

362 fBodyAccJerk-energy()-Y

363 fBodyAccJerk-energy()-Z

364 fBodyAccJerk-iqr()-X

365 fBodyAccJerk-iqr()-Y

366 fBodyAccJerk-iqr()-Z

367 fBodyAccJerk-entropy()-X

368 fBodyAccJerk-entropy()-Y

369 fBodyAccJerk-entropy()-Z

370 fBodyAccJerk-maxInds-X

371 fBodyAccJerk-maxInds-Y

372 fBodyAccJerk-maxInds-Z

373 fBodyAccJerk-meanFreq()-X

374 fBodyAccJerk-meanFreq()-Y

375 fBodyAccJerk-meanFreq()-Z

376 fBodyAccJerk-skewness()-X

377 fBodyAccJerk-kurtosis()-X

378 fBodyAccJerk-skewness()-Y

379 fBodyAccJerk-kurtosis()-Y

380 fBodyAccJerk-skewness()-Z

381 fBodyAccJerk-kurtosis()-Z

382 fBodyAccJerk-bandsEnergy()-1,8

383 fBodyAccJerk-bandsEnergy()-9,16

384 fBodyAccJerk-bandsEnergy()-17,24

385 fBodyAccJerk-bandsEnergy()-25,32

386 fBodyAccJerk-bandsEnergy()-33,40

387 fBodyAccJerk-bandsEnergy()-41,48

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395 fBodyAccJerk-bandsEnergy()-25,48
396 fBodyAccJerk-bandsEnergy()-1,8
397 fBodyAccJerk-bandsEnergy()-9,16
398 fBodyAccJerk-bandsEnergy()-17,24
399 fBodyAccJerk-bandsEnergy()-25,32
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403 fBodyAccJerk-bandsEnergy()-57,64
404 fBodyAccJerk-bandsEnergy()-1,16
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406 fBodyAccJerk-bandsEnergy()-33,48
407 fBodyAccJerk-bandsEnergy()-49,64
408 fBodyAccJerk-bandsEnergy()-1,24
409 fBodyAccJerk-bandsEnergy()-25,48
410 fBodyAccJerk-bandsEnergy()-1,8
411 fBodyAccJerk-bandsEnergy()-9,16
412 fBodyAccJerk-bandsEnergy()-17,24
413 fBodyAccJerk-bandsEnergy()-25,32
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415 fBodyAccJerk-bandsEnergy()-41,48
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417 fBodyAccJerk-bandsEnergy()-57,64
418 fBodyAccJerk-bandsEnergy()-1,16
419 fBodyAccJerk-bandsEnergy()-17,32
420 fBodyAccJerk-bandsEnergy()-33,48
421 fBodyAccJerk-bandsEnergy()-49,64
422 fBodyAccJerk-bandsEnergy()-1,24
423 fBodyAccJerk-bandsEnergy()-25,48
424 fBodyGyro-mean()-X

425 fBodyGyro-mean()-Y

426 fBodyGyro-mean()-Z

427 fBodyGyro-std()-X

428 fBodyGyro-std()-Y

429 fBodyGyro-std()-Z

430 fBodyGyro-mad()-X

431 fBodyGyro-mad()-Y

432 fBodyGyro-mad()-Z

433 fBodyGyro-max()-X

434 fBodyGyro-max()-Y

435 fBodyGyro-max()-Z

436 fBodyGyro-min()-X

437 fBodyGyro-min()-Y

438 fBodyGyro-min()-Z

439 fBodyGyro-sma()

440 fBodyGyro-energy()-X

441 fBodyGyro-energy()-Y

442 fBodyGyro-energy()-Z

443 fBodyGyro-iqr()-X

444 fBodyGyro-iqr()-Y

445 fBodyGyro-iqr()-Z

446 fBodyGyro-entropy()-X

447 fBodyGyro-entropy()-Y

448 fBodyGyro-entropy()-Z

449 fBodyGyro-maxInds-X

450 fBodyGyro-maxInds-Y

451 fBodyGyro-maxInds-Z

452 fBodyGyro-meanFreq()-X

453 fBodyGyro-meanFreq()-Y

454 fBodyGyro-meanFreq()-Z

455 fBodyGyro-skewness()-X

456 fBodyGyro-kurtosis()-X

457 fBodyGyro-skewness()-Y

458 fBodyGyro-kurtosis()-Y

459 fBodyGyro-skewness()-Z

460 fBodyGyro-kurtosis()-Z

461 fBodyGyro-bandsEnergy()-1,8

462 fBodyGyro-bandsEnergy()-9,16

463 fBodyGyro-bandsEnergy()-17,24

464 fBodyGyro-bandsEnergy()-25,32

465 fBodyGyro-bandsEnergy()-33,40

466 fBodyGyro-bandsEnergy()-41,48

467 fBodyGyro-bandsEnergy()-49,56

468 fBodyGyro-bandsEnergy()-57,64

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470 fBodyGyro-bandsEnergy()-17,32

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472 fBodyGyro-bandsEnergy()-49,64

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484 fBodyGyro-bandsEnergy()-17,32

485 fBodyGyro-bandsEnergy()-33,48

486 fBodyGyro-bandsEnergy()-49,64

487 fBodyGyro-bandsEnergy()-1,24

488 fBodyGyro-bandsEnergy()-25,48

489 fBodyGyro-bandsEnergy()-1,8

490 fBodyGyro-bandsEnergy()-9,16

491 fBodyGyro-bandsEnergy()-17,24

492 fBodyGyro-bandsEnergy()-25,32

493 fBodyGyro-bandsEnergy()-33,40

494 fBodyGyro-bandsEnergy()-41,48

495 fBodyGyro-bandsEnergy()-49,56

496 fBodyGyro-bandsEnergy()-57,64

497 fBodyGyro-bandsEnergy()-1,16

498 fBodyGyro-bandsEnergy()-17,32

499 fBodyGyro-bandsEnergy()-33,48

500 fBodyGyro-bandsEnergy()-49,64

501 fBodyGyro-bandsEnergy()-1,24

502 fBodyGyro-bandsEnergy()-25,48

503 fBodyAccMag-mean()

504 fBodyAccMag-std()

505 fBodyAccMag-mad()

506 fBodyAccMag-max()

507 fBodyAccMag-min()

508 fBodyAccMag-sma()

509 fBodyAccMag-energy()

510 fBodyAccMag-iqr()

511 fBodyAccMag-entropy()

512 fBodyAccMag-maxInds

513 fBodyAccMag-meanFreq()

514 fBodyAccMag-skewness()

515 fBodyAccMag-kurtosis()

516 fBodyBodyAccJerkMag-mean()

517 fBodyBodyAccJerkMag-std()

518 fBodyBodyAccJerkMag-mad()

519 fBodyBodyAccJerkMag-max()

520 fBodyBodyAccJerkMag-min()

521 fBodyBodyAccJerkMag-sma()

522 fBodyBodyAccJerkMag-energy()

523 fBodyBodyAccJerkMag-iqr()

524 fBodyBodyAccJerkMag-entropy()

525 fBodyBodyAccJerkMag-maxInds

526 fBodyBodyAccJerkMag-meanFreq()

527 fBodyBodyAccJerkMag-skewness()

528 fBodyBodyAccJerkMag-kurtosis()

529 fBodyBodyGyroMag-mean()

530 fBodyBodyGyroMag-std()

531 fBodyBodyGyroMag-mad()

532 fBodyBodyGyroMag-max()

533 fBodyBodyGyroMag-min()

534 fBodyBodyGyroMag-sma()

535 fBodyBodyGyroMag-energy()

536 fBodyBodyGyroMag-iqr()

537 fBodyBodyGyroMag-entropy()

538 fBodyBodyGyroMag-maxInds

539 fBodyBodyGyroMag-meanFreq()

540 fBodyBodyGyroMag-skewness()

541 fBodyBodyGyroMag-kurtosis()

542 fBodyBodyGyroJerkMag-mean()

543 fBodyBodyGyroJerkMag-std()

544 fBodyBodyGyroJerkMag-mad()

545 fBodyBodyGyroJerkMag-max()

546 fBodyBodyGyroJerkMag-min()

547 fBodyBodyGyroJerkMag-sma()

548 fBodyBodyGyroJerkMag-energy()

549 fBodyBodyGyroJerkMag-iqr()

550 fBodyBodyGyroJerkMag-entropy()

551 fBodyBodyGyroJerkMag-maxInds

552 fBodyBodyGyroJerkMag-meanFreq()

553 fBodyBodyGyroJerkMag-skewness()

554 fBodyBodyGyroJerkMag-kurtosis()

555 angle(tBodyAccMean,gravity)

556 angle(tBodyAccJerkMean),gravityMean)

557 angle(tBodyGyroMean,gravityMean)

558 angle(tBodyGyroJerkMean,gravityMean)

559 angle(X,gravityMean)

560 angle(Y,gravityMean)

561 angle(Z,gravityMean)

Signal info 17

Estimate variable

1 tBodyAcc-XYZ

2 tGravityAcc-XYZ

3 tBodyAccJerk-XYZ

4 tBodyGyro-XYZ

5 tBodyGyroJerk-XYZ

6 tBodyAccMag

7 tGravityAccMag

8 tBodyAccJerkMag

9 tBodyGyroMag

10 tBodyGyroJerkMag

11 fBodyAcc-XYZ

12 fBodyAccJerk-XYZ

13 fBodyGyro-XYZ

14 fBodyAccMag

15 fBodyAccJerkMag

16 fBodyGyroMag

17 fBodyGyroJerkMag

Signal Variables 17

estimated

1 mean(): Mean value

2 std(): Standard deviation

3 mad(): Median absolute deviation

4 max(): Largest value in array

5 min(): Smallest value in array

6 sma(): Signal magnitude area

7 energy(): Energy measure. Sum of the squares divided by the number of values.

8 iqr(): Interquartile range

9 entropy(): Signal entropy

10 arCoeff(): Autorregresion coefficients with Burg order equal to 4

11 correlation(): correlation coefficient between two signals

12 maxInds(): index of the frequency component with largest magnitude

13 meanFreq(): Weighted average of the frequency components to obtain a mean frequency

14 skewness(): skewness of the frequency domain signal

15 kurtosis(): kurtosis of the frequency domain signal

16 bandsEnergy(): Energy of a frequency interval within the 64 bins of the FFT of each window.

17 angle(): Angle between to vectors.

angle() variable 5

averaging the signals in a signal window sample

1 gravityMean

2 tBodyAccMean

3 tBodyAccJerkMean

4 tBodyGyroMean

5 tBodyGyroJerkMean

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 (prefix 't' to denote time) 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. Similarly, the acceleration signal was then separated into body and gravity acceleration signals (tBodyAcc-XYZ and tGravityAcc-XYZ) using another low pass Butterworth filter with a corner frequency of 0.3 Hz.

Subsequently, the body linear acceleration and angular velocity were derived in time to obtain Jerk signals (tBodyAccJerk-XYZ and tBodyGyroJerk-XYZ). Also the magnitude of these three-dimensional signals were calculated using the Euclidean norm (tBodyAccMag, tGravityAccMag, tBodyAccJerkMag, tBodyGyroMag, tBodyGyroJerkMag).

Finally a Fast Fourier Transform (FFT) was applied to some of these signals producing fBodyAcc-XYZ, fBodyAccJerk-XYZ, fBodyGyro-XYZ, fBodyAccJerkMag, fBodyGyroMag, fBodyGyroJerkMag. (Note the 'f' to indicate frequency domain signals).

For more information about this dataset contact:
activityrecognition@smartlab.ws

License:

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Use of this dataset in publications must be acknowledged by referencing the following publication [1]

[1] Davide Anguita, Alessandro Ghio, Luca Oneto, Xavier Parra and Jorge L. Reyes-Ortiz. Human Activity Recognition on Smartphones using a Multiclass Hardware-Friendly Support Vector Machine. International Workshop of Ambient Assisted Living (IWAAL 2012). Vitoria-Gasteiz, Spain. Dec 2012

Jorge L. Reyes-Ortiz, Alessandro Ghio, Luca Oneto, Davide Anguita. November 2012.