Assignment 5

1. We will use the packages soundgen, its dependency seewave, and tuneR as the basic dependency for the analysis. Use readMP3() to read in the audiofiles into R.

library(soundgen) library(tuneR) library(dplyr) library(tidyr) library(seewave)

*#create a list*

mp3list <- list.files(path = "Sounds", pattern = ".mp3", full.names = T)

*#readMP3*

mp3data <- lapply(mp3list, FUN = **function**(f) readMP3(f))

1. Load the ratings file using csv(). For each audio clip, obtain the human predicted emotion as the emotion for which the score of that clip is the highest among emotions rated.

ratings <- read.csv("ratings\_compiled\_preprocessed.csv", header=TRUE, sep = ",") head(ratings)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## |  | X |  |  | sound amusement | | anger | disgust |  |
| ## | 1 | 1 | ut\_anger\_05-f-grunt-with-effort.mp3 0.000000 28.545455 3.8787879 | | | | | |
| ## | 2 | 2 | ut\_anger\_06-f-roar.mp3 9.233333 15.666667 5.6666667 | | | | | |
| ## | 3 | 3 | ut\_anger\_09-f-scream.mp3 2.631579 5.315789 0.7105263 | | | | | |
| ## | 4 | 4 | ut\_anger\_13-m-roar-scream.mp3 5.064516 34.548387 6.4516129 | | | | | |
| ## | 5 | 5 | ut\_anger\_21-m-roar-growl.mp3 0.000000 26.200000 6.2571429 | | | | | |
| ## | 6 | 6 | ut\_anger\_23-f-roar-scream.mp3 0.000000 45.823529 0.0000000 | | | | | |
| ## |  |  | effort fear joy pain pleasure sadness no\_reps | | | | | | shown |
| ## | 1 | 43.4848485 | | 2.060606 0.0000000 | 14.06061 1.545455 0.0000000 1.696970 | | | | 33 |
| ## | 2 | 4.8000000 | | 23.266667 3.0000000 | 2.70000 3.333333 0.0000000 1.266667 | | | | 30 |
| ## | 3 | 0.8421053 | | 74.342105 0.0000000 | 10.23684 0.000000 0.6578947 1.026316 | | | | 38 |
| ## | 4 | 5.3225806 | | 35.032258 0.7741935 | 12.32258 0.000000 1.5161290 1.483871 | | | | 31 |
| ## | 5 | 28.0571429 | | 9.371429 2.4571429 | 29.71429 1.885714 1.1142857 1.228571 | | | | 35 |
| ## | 6 | 2.5588235 | | 36.117647 0.0000000 | 19.44118 0.000000 0.0000000 1.176471 | | | | 34 |
| ## |  | rated skipped num.em real.em | | | context call duration sex emotion | | | | |
| ## | 1 | 32 | | 1 1.562500 anger | smash\_comp | roar | 0.431 | OTHER | effort |
| ## | 2 | 26 | | 4 1.269231 anger | lose\_game | roar | 0.717 | OTHER | fear |
| ## | 3 | 37 | | 1 1.243243 anger | fail\_singing | scream | 0.865 | OTHER | fear |
| ## | 4 | 29 | | 2 1.655172 anger | tantrum | scream | 3.838 | AM | fear |
| ## | 5 | 35 | | 0 1.657143 anger | tantrum | roar | 2.583 | AM | pain |
| ## | 6 | 32 | | 2 1.468750 anger | lose\_game | roar | 1.253 | OTHER | anger |
| ## |  | correct | |  |  |  |  |  |  |

## 1 FALSE

## 2 FALSE

## 3 FALSE

## 4 FALSE

## 5 FALSE

## 6 TRUE

rating\_emotion <- subset(ratings, TRUE, c(sound, emotion)) head(rating\_emotion)

## sound emotion

## 1 ut\_anger\_05-f-grunt-with-effort.mp3 effort ## 2 ut\_anger\_06-f-roar.mp3 fear

## 3 ut\_anger\_09-f-scream.mp3 fear ## 4 ut\_anger\_13-m-roar-scream.mp3 fear ## 5 ut\_anger\_21-m-roar-growl.mp3 pain ## 6 ut\_anger\_23-f-roar-scream.mp3 anger

1. The next step is to extract some acoustic features from the audio clips. Extract the fundamental frequency of each clip using the fund() Include two features based on the fundamental frequency: The average frequency across the clip, and the standard deviation. Omit NA values from your calculations.

f\_frequency <- lapply(mp3data, FUN = **function**(f) fund(f))

Example of the output

20



15

Frequency (kHz)

10

5

0

0.0 0.1 0.2 0.3 0.4

Time (s)

f\_frequency2 <- lapply(f\_frequency, na.omit) head(f\_frequency2)

## [[1]]

## x y

## [1,] 0.03616954 0.98

## [2,] 0.10850863 14.70

## [3,] 0.33758242 14.70

## attr(,"na.action")

## [1] 1 2 3 5 6 7 8 9 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

## [26] 28 30 31 32 33 34 35 36 37 38 39 40

## attr(,"class")

## [1] "omit" ##

|  |  |  |
| --- | --- | --- |
| ## | [[2]] |  |
| ## | x | y |
| ## | [1,] 0.02367347 | 4.410 |
| ## | [2,] 0.03551020 | 6.300 |

|  |  |  |  |
| --- | --- | --- | --- |
| ## | [3,] | 0.05918367 | 14.700 |
| ## | [4,] | 0.07102041 | 14.700 |
| ## | [5,] | 0.08285714 | 14.700 |
| ## | [6,] | 0.11836735 | 14.700 |
| ## | [7,] | 0.14204082 | 14.700 |
| ## | [8,] | 0.20122449 | 14.700 |
| ## | [9,] | 0.22489796 | 14.700 |
| ## | [10,] | 0.23673469 | 14.700 |
| ## | [11,] | 0.26040816 | 14.700 |
| ## | [12,] | 0.29591837 | 14.700 |
| ## | [13,] | 0.30775510 | 14.700 |
| ## | [14,] | 0.31959184 | 14.700 |
| ## | [15,] | 0.33142857 | 14.700 |
| ## | [16,] | 0.34326531 | 14.700 |
| ## | [17,] | 0.36693878 | 14.700 |
| ## | [18,] | 0.37877551 | 14.700 |
| ## | [19,] | 0.40244898 | 14.700 |
| ## | [20,] | 0.41428571 | 14.700 |
| ## | [21,] | 0.42612245 | 14.700 |
| ## | [22,] | 0.43795918 | 14.700 |
| ## | [23,] | 0.47346939 | 14.700 |
| ## | [24,] | 0.54448980 | 14.700 |
| ## | [25,] | 0.58000000 | 14.700 |
| ## | [26,] | 0.59183673 | 14.700 |
| ## | [27,] | 0.68653061 | 11.025 |

## attr(,"na.action")

## [1] 1 2 5 9 10 12 14 15 16 17 19 22 24 25 31 34 39 40 42 43 44 45 46 48 49

## [26] 52 53 54 55 56 57 58 60 61 62 63 64 65

## attr(,"class")

## [1] "omit" ##

## [[3]]

## x y

|  |  |  |  |
| --- | --- | --- | --- |
| ## | [1,] | 0.1781076 | 2.321053 |
| ## | [2,] | 0.1899814 | 2.450000 |
| ## | [3,] | 0.2018553 | 2.450000 |
| ## | [4,] | 0.2137291 | 2.940000 |
| ## | [5,] | 0.2256030 | 2.940000 |
| ## | [6,] | 0.2374768 | 2.940000 |
| ## | [7,] | 0.2493506 | 2.940000 |
| ## | [8,] | 0.2612245 | 2.940000 |
| ## | [9,] | 0.2730983 | 2.940000 |
| ## | [10,] | 0.2849722 | 3.150000 |
| ## | [11,] | 0.2968460 | 3.150000 |
| ## | [12,] | 0.3087199 | 2.940000 |
| ## | [13,] | 0.3205937 | 2.940000 |
| ## | [14,] | 0.3324675 | 2.940000 |
| ## | [15,] | 0.3443414 | 3.150000 |
| ## | [16,] | 0.3562152 | 3.150000 |
| ## | [17,] | 0.3680891 | 3.150000 |
| ## | [18,] | 0.3799629 | 3.150000 |
| ## | [19,] | 0.3918367 | 3.150000 |
| ## | [20,] | 0.4037106 | 2.940000 |
| ## | [21,] | 0.4155844 | 3.150000 |

|  |  |  |  |
| --- | --- | --- | --- |
| ## | [22,] | 0.4274583 | 3.150000 |
| ## | [23,] | 0.4393321 | 3.150000 |
| ## | [24,] | 0.4512059 | 3.150000 |
| ## | [25,] | 0.4630798 | 3.150000 |
| ## | [26,] | 0.4749536 | 3.150000 |
| ## | [27,] | 0.4868275 | 2.940000 |
| ## | [28,] | 0.4987013 | 2.940000 |
| ## | [29,] | 0.5105751 | 2.940000 |
| ## | [30,] | 0.5224490 | 2.756250 |
| ## | [31,] | 0.5343228 | 2.756250 |
| ## | [32,] | 0.5461967 | 2.450000 |
| ## | [33,] | 0.5580705 | 2.205000 |

|  |  |
| --- | --- |
| ## | attr(,"class") |
| ## | [1] "omit" |
| ## |  |
| ## | [[5]] |
| ## | x y |
| ## | [1,] 0.02332362 2.94 |
| ## | [2,] 0.80466472 8.82 |
| ## | [3,] 0.81632653 8.82 |
| ## | [4,] 0.83965015 4.90 |
| ## | [5,] 0.85131195 8.82 |
| ## | [6,] 0.90962099 8.82 |
| ## | [7,] 0.95626822 8.82 |
| ## | attr(,"na.action") |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## | attr(,"na.action") | | | | |  | | | | | | | | | | | | | | |
| ## | [1] 1 2 3 4 5 | | | | | 6 | 7 | 8 9 10 | | 11 | 12 13 14 15 | | | 49 50 51 52 | | | 53 54 55 56 | | | 57 58 |
| ## | [26] 59 60 61 62 63 | | | | | 64 | 65 | 66 67 68 | | 69 | 70 71 72 73 | | | 74 75 76 77 | | | 78 | | |  |
| ## | attr(,"class") | | | | |  |  |  | |  |  | | |  | | |  | | |  |
| ## | [1] "omit" | | | | |  |  |  | |  |  | | |  | | |  | | |  |
| ## |  | | | | |  |  |  | |  |  | | |  | | |  | | |  |
| ## | [[4]] | | | | |  |  |  | |  |  | | |  | | |  | | |  |
| ## | x y | | | | |  |  |  | |  |  | | |  | | |  | | |  |
| ## | [1,] 0.2561888 14.7 | | | | |  |  |  | |  |  | | |  | | |  | | |  |
| ## | attr(,"na.action") | | | | |  |  |  | |  |  | | |  | | |  | | |  |
| ## | [1] | 1 | 2 | 3 | 4 | | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| ## | [19] | 19 | 20 | 21 | 22 | | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
| ## | [37] | 38 | 39 | 40 | 41 | | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 |
| ## | [55] | 56 | 57 | 58 | 59 | | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 |
| ## | [73] | 74 | 75 | 76 | 77 | | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 |
| ## | [91] | 92 | 93 | 94 | 95 | | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 |
| ## | [109] | 110 | 111 | 112 | 113 | | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 |
| ## | [127] | 128 | 129 | 130 | 131 | | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 |
| ## | [145] | 146 | 147 | 148 | 149 | | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 |
| ## | [163] | 164 | 165 | 166 | 167 | | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | 181 |
| ## | [181] | 182 | 183 | 184 | 185 | | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 |
| ## | [199] | 200 | 201 | 202 | 203 | | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 |
| ## | [217] | 218 | 219 | 220 | 221 | | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 |
| ## | [235] | 236 | 237 | 238 | 239 | | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 |
| ## | [253] | 254 | 255 | 256 | 257 | | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 |
| ## | [271] | 272 | 273 | 274 | 275 | | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 |
| ## | [289] | 290 | 291 | 292 | 293 | | 294 | 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 |
| ## | [307] | 308 | 309 | 310 | 311 | | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 | 325 |
| ## | [325] | 326 | 327 | 328 | 329 | | 330 | 331 | 332 | 333 |  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## | [1] | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| ## | [19] | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
| ## | [37] | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 |
| ## | [55] | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 72 | 75 | 76 | 77 |
| ## | [73] | 78 | 80 | 81 | 82 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 |
| ## | [91] | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 |
| ## | [109] | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 |
| ## | [127] | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 |
| ## | [145] | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 |
| ## | [163] | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 |
| ## | [181] | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 |
| ## | [199] | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 |
| ## | [217] | 224 | 225 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| ## ## ## | attr(,"class")  [1] "omit" | | |
| ## | [[6]] |  |  |
| ## |  | x | y |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## | [1,] 0.0587156 8.82 |  | | | | | | | | | | | | | |
| ## | attr(,"na.action") |
| ## | [1] 1 2 3 4 | 5 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| ## | [19] 20 21 22 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
| ## | [37] 38 39 40 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 |
| ## | [55] 56 57 58 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 |
| ## | [73] 74 75 76 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 |
| ## | [91] 92 93 94 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 |
| ## | [109] 110 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ## | attr(,"class") |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ## | [1] "omit" |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

mean\_frequency <- lapply(f\_frequency2, mean) head(mean\_frequency)

## [[1]]

## [1] 5.14371 ##

## [[2]]

## [1] 7.090588 ##

## [[3]]

## [1] 1.647053 ##

## [[4]]

## [1] 7.478094 ##

## [[5]]

## [1] 4.081512 ##

## [[6]]

## [1] 4.439358

mean\_frequency2 <-lapply(mean\_frequency, na.omit)

deviation\_frequency <- lapply(f\_frequency2, sd) head(deviation\_frequency)

## [[1]]

## [1] 7.409736 ##

## [[2]]

## [1] 7.07822 ##

## [[3]]

## [1] 1.30478 ##

## [[4]]

## [1] 10.21332 ##

## [[5]]

## [1] 3.851865 ##

## [[6]]

## [1] 6.195164

1. Jitter is defined as the average absolute difference in fundamental frequency across the clip. Compute this using the fund() function, and omit NA values from your calculation.

rm(jitter\_data)

## Warning in rm(jitter\_data): object ’jitter\_data’ not found

jitter\_data <- data.frame(matrix(data=NA, ncol = 1, nrow = 260))

**for** (i **in** 1:length(f\_frequency2)){

jitter\_mean <- mean(abs(diff(f\_frequency2[[i]][,2]))) jitter\_data$jmean[i] <- jitter\_mean

}

Jitter <- lapply(jitter\_data[[2]], na.omit) head(Jitter)

## [[1]]

## [1] 6.86 ##

## [[2]]

## [1] 0.5371154 ##

## [[3]]

## [1] 0.08168586 ##

## [[4]]

## numeric(0)

## attr(,"na.action")

## [1] 1

## attr(,"class")

## [1] "omit" ##

## [[5]]

## [1] 2.286667 ##

## [[6]]

## numeric(0)

## attr(,"na.action") ## [1] 1

## attr(,"class")

## [1] "omit"

1. Shimmer is defined as the average absolute difference in amplitude across the clip. Use the env() function with envt = “abs” to extract the amplitude across the clip, and compute the shimmer.

shimmer\_avg <- NULL

*#looping through all the audio files*

**for** (i **in** 1:length(mp3data)){

shimmer\_avg <- env(mp3data[[i]], envt = "abs", plot = FALSE)

*#removing NAs from the list*

shimmer\_avg <- na.omit(shimmer\_avg)

*#the average absolute difference in amplitude*

ratings$shimmer\_avg[i] <- mean(shimmer\_avg)

}

*#ratings dataset with the average absolute difference in amplitude across the clip*

head(ratings)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## |  | X |  |  | sound amusement | | anger | disgust |  |
| ## | 1 | 1 | ut\_anger\_05-f-grunt-with-effort.mp3 0.000000 28.545455 3.8787879 | | | | | |
| ## | 2 | 2 | ut\_anger\_06-f-roar.mp3 9.233333 15.666667 5.6666667 | | | | | |
| ## | 3 | 3 | ut\_anger\_09-f-scream.mp3 2.631579 5.315789 0.7105263 | | | | | |
| ## | 4 | 4 | ut\_anger\_13-m-roar-scream.mp3 5.064516 34.548387 6.4516129 | | | | | |
| ## | 5 | 5 | ut\_anger\_21-m-roar-growl.mp3 0.000000 26.200000 6.2571429 | | | | | |
| ## | 6 | 6 | ut\_anger\_23-f-roar-scream.mp3 0.000000 45.823529 0.0000000 | | | | | |
| ## |  |  | effort fear joy pain pleasure sadness no\_reps | | | | | | shown |
| ## | 1 | 43.4848485 | | 2.060606 0.0000000 | 14.06061 1.545455 0.0000000 1.696970 | | | | 33 |
| ## | 2 | 4.8000000 | | 23.266667 3.0000000 | 2.70000 3.333333 0.0000000 1.266667 | | | | 30 |
| ## | 3 | 0.8421053 | | 74.342105 0.0000000 | 10.23684 0.000000 0.6578947 1.026316 | | | | 38 |
| ## | 4 | 5.3225806 | | 35.032258 0.7741935 | 12.32258 0.000000 1.5161290 1.483871 | | | | 31 |
| ## | 5 | 28.0571429 | | 9.371429 2.4571429 | 29.71429 1.885714 1.1142857 1.228571 | | | | 35 |
| ## | 6 | 2.5588235 | | 36.117647 0.0000000 | 19.44118 0.000000 0.0000000 1.176471 | | | | 34 |
| ## |  | rated skipped num.em real.em | | | context call duration sex emotion | | | | |
| ## | 1 | 32 | | 1 1.562500 anger | smash\_comp | roar | 0.431 | OTHER | effort |
| ## | 2 | 26 | | 4 1.269231 anger | lose\_game | roar | 0.717 | OTHER | fear |
| ## | 3 | 37 | | 1 1.243243 anger | fail\_singing | scream | 0.865 | OTHER | fear |
| ## | 4 | 29 | | 2 1.655172 anger | tantrum | scream | 3.838 | AM | fear |
| ## | 5 | 35 | | 0 1.657143 anger | tantrum | roar | 2.583 | AM | pain |
| ## | 6 | 32 | | 2 1.468750 anger | lose\_game | roar | 1.253 | OTHER | anger |
| ## |  | correct shimmer\_avg | | |  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| ## 1 | FALSE | 4780.185 |
| ## 2 | FALSE | 4519.229 |
| ## 3 | FALSE | 9290.704 |
| ## 4 | FALSE | 2834.609 |
| ## 5 | FALSE | 2780.172 |
| ## 6 | TRUE | 4966.786 |

1. Some other features can be extracted using the analyze()/analyzeFolder() Note that the latter function operates directly on the directory where the sounds are stored, so point it there. Use pitchMethods = “autocor” as your method of choice. The function returns harmonic-to-noise ratio (mean and standard deviation), pitch (mean and standard deviation), loudness (mean and standard deviation), and timbre (as specCentroid, mean and standard deviation). Extract these features.

test\_analyze <- analyze(mp3data[1], pitchMethods = "autocor") test\_analyze

## $detailed

## duration duration\_noSilence time amEnvDep amEnvDepVoiced amEnvFreq

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## | 1 | 0.4702041 | 0.4248299 | 24.98866 | NA | | NA | | NA |
| ## | 2 | 0.4702041 | 0.4248299 | 49.97732 | 0.1341990 | | NA | | 20.74374 |
| ## | 3 | 0.4702041 | 0.4248299 | 74.96599 | 0.2558067 | | NA | | 18.90941 |
| ## | 4 | 0.4702041 | 0.4248299 | 99.95465 | 0.3774145 | | 0.3774145 | | 17.07508 |
| ## | 5 | 0.4702041 | 0.4248299 | 124.94331 | 0.4990223 | | 0.4990223 | | 15.24075 |
| ## | 6 | 0.4702041 | 0.4248299 | 149.93197 | 0.6206301 | | 0.6206301 | | 13.40641 |
| ## | 7 | 0.4702041 | 0.4248299 | 174.92063 | 0.6153678 | | 0.6153678 | | 14.93649 |
| ## | 8 | 0.4702041 | 0.4248299 | 199.90930 | 0.5466705 | | 0.5466705 | | 18.14876 |
| ## | 9 | 0.4702041 | 0.4248299 | 224.89796 | 0.4779731 | | 0.4779731 | | 21.36103 |
| ## | 10 | 0.4702041 | 0.4248299 | 249.88662 | 0.4092758 | | 0.4092758 | | 24.57331 |
| ## | 11 | 0.4702041 | 0.4248299 | 274.87528 | 0.3405784 | | 0.3405784 | | 27.78558 |
| ## | 12 | 0.4702041 | 0.4248299 | 299.86395 | 0.2840852 | | NA | | 30.12996 |
| ## | 13 | 0.4702041 | 0.4248299 | 324.85261 | 0.2520002 | | NA | | 30.73855 |
| ## | 14 | 0.4702041 | 0.4248299 | 349.84127 | 0.2199152 | | NA | | 31.34714 |
| ## | 15 | 0.4702041 | 0.4248299 | 374.82993 | 0.1878302 | | NA | | 31.95573 |
| ## | 16 | 0.4702041 | 0.4248299 | 399.81859 | 0.1557452 | | NA | | 32.56432 |
| ##  ## | 17 | 0.4702041 0.4248299 424.80726 0.1236602 NA 33.17291  amEnvFreqVoiced amEnvPurity amEnvPurityVoiced amMsFreq amMsFreqVoiced | | | | | | | |
| ## | 1 | NA | NA | NA | | NA | | NA | |
| ## | 2 | NA | -15.09012 | NA | | NA | | NA | |
| ## | 3 | NA | -15.17654 | NA | | NA | | NA | |
| ## | 4 | 17.07508 | -15.26297 | -15.26297 | | NA | | NA | |
| ## | 5 | 15.24075 | -15.34939 | -15.34939 | | 68.05556 | | 68.05556 | |
| ## | 6 | 13.40641 | -15.43581 | -15.43581 | | 77.33586 | | 77.33586 | |
| ## | 7 | 14.93649 | -15.31856 | -15.31856 | | 86.61616 | | 86.61616 | |
| ## | 8 | 18.14876 | -15.09947 | -15.09947 | | 95.89646 | | 95.89646 | |
| ## | 9 | 21.36103 | -14.88038 | -14.88038 | | 105.17677 | | 105.17677 | |
| ## | 10 | 24.57331 | -14.66129 | -14.66129 | | 102.08333 | | 102.08333 | |
| ## | 11 | 27.78558 | -14.44220 | -14.44220 | | 98.98990 | | 98.98990 | |
| ## | 12 | NA | -14.33852 | NA | | 95.89646 | | NA | |
| ## | 13 | NA | -14.46567 | NA | | 92.80303 | | NA | |
| ## | 14 | NA | -14.59283 | NA | | 89.70960 | | NA | |
| ## | 15 | NA | -14.71998 | NA | | 86.61616 | | NA | |
| ## | 16 | NA | -14.84713 | NA | | 83.52273 | | NA | |
| ## | 17 | NA | -14.97428 | NA | | 80.42929 | | NA | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## |  | amMsPurity | amMsPurityVoiced | | | ampl | ampl\_noSilence | | | | amplVoiced | | | CPP |
| ## | 1 | NA | NA | | | 1.921638e-05 | NA | | | | NA | | | NA |
| ## | 2 | NA | NA | | | 4.377054e-02 | 0.04377054 | | | | NA | | | NA |
| ## | 3 | NA | NA | | | 1.473617e-01 | 0.14736174 | | | | NA | | | NA |
| ## | 4 | NA | NA | | | 2.169033e-01 | 0.21690325 | | | | 0.2169033 | | | 7.587387 |
| ## | 5 | -14.47885 | -14.47885 | | | 2.420602e-01 | 0.24206015 | | | | 0.2420602 | | | 7.211035 |
| ## | 6 | -15.58821 | -15.58821 | | | 2.358556e-01 | 0.23585563 | | | | 0.2358556 | | | 9.949654 |
| ## | 7 | -16.69757 | -16.69757 | | | 2.628348e-01 | 0.26283484 | | | | 0.2628348 | | | 7.390516 |
| ## | 8 | -17.80693 | -17.80693 | | | 3.221704e-01 | 0.32217043 | | | | 0.3221704 | | | 8.857542 |
| ## | 9 | -18.91630 | -18.91630 | | | 3.472899e-01 | 0.34728995 | | | | 0.3472899 | | | 8.050193 |
| ## | 10 | -18.04369 | -18.04369 | | | 3.427960e-01 | 0.34279603 | | | | 0.3427960 | | | 5.585473 |
| ## | 11 | -17.17108 | -17.17108 | | | 2.946503e-01 | 0.29465029 | | | | 0.2946503 | | | 4.382925 |
| ## | 12 | -16.29847 | NA | | | 2.576286e-01 | 0.25762861 | | | | NA | | | NA |
| ## | 13 | -15.42587 | NA | | | 2.349771e-01 | 0.23497705 | | | | NA | | | NA |
| ## | 14 | -14.76342 | NA | | | 1.657910e-01 | 0.16579097 | | | | NA | | | NA |
| ## | 15 | -14.10098 | NA | | | 1.213232e-01 | 0.12132317 | | | | NA | | | NA |
| ## | 16 | -13.43854 | NA | | | 9.455320e-02 | 0.09455320 | | | | NA | | | NA |
| ##  ## | 17 | -12.77610 NA 4.942758e-02 0.04942758 NA NA  dom domVoiced entropy entropyVoiced epoch f1\_freq f1\_width f2\_freq | | | | | | | | | | | | |
| ## | 1 | NA | NA | 0.688854001 | | NA | 1 | NA | | NA | | | NA | |
| ## | 2 | NA | NA | 0.169394558 | | NA | 1 | 611.67 | | 193.39966 | | | 1406.36 | |
| ## | 3 | NA | NA | 0.040737998 | | NA | 1 | 710.26 | | 367.32844 | | | 1305.79 | |
| ## | 4 | NA | NA | 0.071137944 | | 0.07113794 | 2 | 790.14 | | 236.67967 | | | 1282.19 | |
| ## | 5 | NA | NA | 0.045380561 | | 0.04538056 | 2 | 668.61 | | 307.07336 | | | 1325.89 | |
| ## | 6 | NA | NA | 0.079277286 | | 0.07927729 | 2 | 714.54 | | 341.63779 | | | 1380.12 | |
| ## | 7 | NA | NA | 0.037633136 | | 0.03763314 | 2 | 733.95 | | 188.95810 | | | 1346.37 | |
| ## | 8 | NA | NA | 0.069967520 | | 0.06996752 | 2 | 808.57 | | 201.29240 | | | 1297.05 | |
| ## | 9 | NA | NA | 0.029269399 | | 0.02926940 | 2 | 940.74 | | 49.95282 | | | 1244.90 | |
| ## | 10 | NA | NA | 0.077936774 | | 0.07793677 | 2 | 939.19 | | 47.79599 | | | 1503.91 | |
| ## | 11 | NA | NA | 0.035069269 | | 0.03506927 | 2 | 880.07 | | 125.24947 | | | 1336.60 | |
| ## | 12 | NA | NA | 0.058124278 | | NA | 2 | 820.83 | | 232.52642 | | | 1345.45 | |
| ## | 13 | NA | NA | 0.024405773 | | NA | 2 | 790.97 | | 228.52073 | | | 1284.73 | |
| ## | 14 | NA | NA | 0.009865814 | | NA | 2 | 824.99 | | 229.73800 | | | 1181.47 | |
| ## | 15 | NA | NA | 0.013980510 | | NA | 2 | 710.38 | | 201.99085 | | | 1073.28 | |
| ## | 16 | NA | NA | 0.035754012 | | NA | 3 | 696.86 | | 184.98741 | | | 1076.84 | |
| ## | 17 | NA | NA | 0.032626614 | | NA | 3 | 609.55 | | 145.44519 | | | 1094.96 | |
| ## |  | f2\_width | f3\_freq f3\_width | | | flux | fmDep fmFreq fmPurity | | | | | | | |
| ## | 1 | NA | NA | | NA | NA | NA | | NA | | | NA | | |
| ## | 2 | 238.26024 | 2486.35 | | 232.30352 | 5.318658e-08 | NA | | NA | | | NA | | |
| ## | 3 | 92.41829 | 2984.54 | | 252.00619 | 3.127910e-03 | NA | | NA | | | NA | | |
| ## | 4 | 64.64407 | 2504.59 | | 541.60932 | 9.939656e-01 | 10.17145 | | 5.002269 | | | -4.437583 | | |
| ## | 5 | 93.10962 | 3148.84 | | 88.65965 | 8.232250e-06 | 10.17145 | | 5.002269 | | | -4.830574 | | |
| ## | 6 | 151.96681 | 2643.60 | | 586.57315 | 9.001850e-04 | 10.17145 | | 5.002269 | | | -4.470347 | | |
| ## | 7 | 155.54938 | 2948.58 | | 236.76838 | 3.738369e-04 | 10.17145 | | 5.002269 | | | -4.110120 | | |
| ## | 8 | 189.84972 | 2892.02 | | 122.67277 | 3.103151e-06 | 10.17145 | | 5.002269 | | | -3.749893 | | |
| ## | 9 | 546.51959 | 2887.97 | | 56.29071 | 7.812555e-04 | 10.17145 | | 5.002269 | | | -3.389666 | | |
| ## | 10 | 384.58610 | 2863.93 | | 48.21301 | 5.370539e-06 | 10.17145 | | 5.002269 | | | -3.267450 | | |
| ## | 11 | 284.81308 | 2868.12 | | 61.50051 | 8.913223e-05 | 10.17145 | | 5.002269 | | | -3.145234 | | |
| ## | 12 | 222.48080 | 2804.67 | | 196.37366 | 2.282454e-04 | NA | | NA | | | NA | | |
| ## | 13 | 155.90886 | 2841.07 | | 153.35985 | 4.181606e-02 | NA | | NA | | | NA | | |
| ## | 14 | 358.72787 | 2930.90 | | 134.43056 | 1.493729e-03 | NA | | NA | | | NA | | |
| ## | 15 | 108.58028 | 2965.33 | | 258.21672 | 9.495765e-05 | NA | | NA | | | NA | | |
| ## | 16 | 175.13710 | 2880.18 | | 113.36054 | 9.472763e-01 | NA | | NA | | | NA | | |
| ## | 17 | 70.04532 | 2854.83 | | 80.89794 | 5.860039e-05 | NA | | NA | | | NA | | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## |  | harmEnergy harmHeight | | |  | HNR | HNRVoiced | loudness | | loudnessVoiced | |
| ## | 1 | NA | NA | | NA | | NA | NA | | NA | |
| ## | 2 | NA | NA | | -4.043538 | | NA | 3.212795 | | NA | |
| ## | 3 | NA | NA | | 1.641735 | | NA | 12.042177 | | NA | |
| ## | 4 | 7.846302 | 4850.633 | | 5.283526 | | 5.283526 | 15.143792 | | 15.14379 | |
| ## | 5 | 15.647371 | 1399.500 | | 2.051296 | | 2.051296 | 16.799300 | | 16.79930 | |
| ## | 6 | 26.483374 | 1399.500 | | 3.050996 | | 3.050996 | 14.795103 | | 14.79510 | |
| ## | 7 | 22.313103 | 572.885 | | 4.870309 | | 4.870309 | 16.981938 | | 16.98194 | |
| ## | 8 | 26.013981 | 572.885 | | 4.726553 | | 4.726553 | 17.775950 | | 17.77595 | |
| ## | 9 | 24.070916 | 1548.013 | | 8.638345 | | 8.638345 | 15.634877 | | 15.63488 | |
| ## | 10 | 9.041802 | 2213.874 | | 9.494124 | | 9.494124 | 17.574264 | | 17.57426 | |
| ## | 11 | 4.624175 | 2213.874 | | 8.653442 | | 8.653442 | 17.722649 | | 17.72265 | |
| ## | 12 | NA | NA | | 3.218296 | | NA | 14.718259 | | NA | |
| ## | 13 | NA | NA | | 2.354848 | | NA | 14.266057 | | NA | |
| ## | 14 | NA | NA | | -3.565571 | | NA | 10.830606 | | NA | |
| ## | 15 | NA | NA | | -3.819071 | | NA | 9.991419 | | NA | |
| ## | 16 | NA | NA | | -1.575552 | | NA | 8.365429 | | NA | |
| ##  ## | 17 | NA  novelty | NA -3.516626 NA 5.147664  noveltyVoiced peakFreq peakFreqVoiced | | | | | | | NA  pitch quartile25 | |
| ## | 1 | NA | NA | | | NA | | NA | | NA | NA |
| ## | 2 | -0.05980552 | NA | | | 580.2632 | | NA | | NA | 680.3085 |
| ## | 3 | -0.27702593 | NA | | | 840.3811 | | NA | | NA | 820.3721 |
| ## | 4 | -0.58947549 | -0.5894755 | | | 1260.5717 | | 1260.5717 | | 431.2703 | 840.3811 |
| ## | 5 | 0.58341898 | 0.5834190 | | | 1340.6080 | | 1340.6080 | | 243.5197 | 740.3358 |
| ## | 6 | -0.15747885 | -0.1574788 | | | 460.2087 | | 460.2087 | | 144.3593 | 800.3630 |
| ## | 7 | -0.28860120 | -0.2886012 | | | 920.4174 | | 920.4174 | | 172.0015 | 660.2995 |
| ## | 8 | -0.32620958 | -0.3262096 | | | 920.4174 | | 920.4174 | | 172.0015 | 800.3630 |
| ## | 9 | 0.31736255 | 0.3173625 | | | 960.4356 | | 960.4356 | | 286.4425 | 940.4265 |
| ## | 10 | -0.53523818 | -0.5352382 | | | 960.4356 | | 960.4356 | | 436.5056 | 860.3902 |
| ## | 11 | -0.26856029 | -0.2685603 | | | 940.4265 | | 940.4265 | | 590.8419 | 720.3267 |
| ## | 12 | 0.33480344 | NA | | | 920.4174 | | NA | | NA | 760.3448 |
| ## | 13 | -0.12297322 | NA | | | 840.3811 | | NA | | NA | 780.3539 |
| ## | 14 | -0.55645191 | NA | | | 880.3993 | | NA | | NA | 720.3267 |
| ## | 15 | 0.08163899 | NA | | | 940.4265 | | NA | | NA | 680.3085 |
| ## | 16 | -0.34609887 | NA | | | 760.3448 | | NA | | NA | 520.2359 |
| ## | 17 | -0.30549162 | NA | | | 460.2087 | | NA | | NA | 560.2541 |
| ## |  |  | | | | | | | | | |
| ## | 1 | NA | | NA | | | NA | | NA | | NA |
| ## | 2 | NA | | 1720.7804 | | | NA | | 4021.824 | | NA |
| ## | 3 | NA | | 1340.6080 | | | NA | | 3181.443 | | NA |
| ## | 4 | 840.3811 | | 1280.5808 | | | 1280.5808 | | 2801.270 | | 2801.270 |
| ## | 5 | 740.3358 | | 1300.5898 | | | 1300.5898 | | 2701.225 | | 2701.225 |
| ## | 6 | 800.3630 | | 1360.6171 | | | 1360.6171 | | 2861.298 | | 2861.298 |
| ## | 7 | 660.2995 | | 1180.5354 | | | 1180.5354 | | 2521.143 | | 2521.143 |
| ## | 8 | 800.3630 | | 1160.5263 | | | 1160.5263 | | 2321.053 | | 2321.053 |
| ## | 9 | 940.4265 | | 1080.4900 | | | 1080.4900 | | 2681.216 | | 2681.216 |
| ## | 10 | 860.3902 | | 960.4356 | | | 960.4356 | | 1920.871 | | 1920.871 |
| ## | 11 | 720.3267 | | 960.4356 | | | 960.4356 | | 2401.089 | | 2401.089 |
| ## | 12 | NA | | 1020.4628 | | | NA | | 2221.007 | | NA |
| ## | 13 | NA | | 980.4446 | | | NA | | 1580.717 | | NA |
| ## | 14 | NA | | 1000.4537 | | | NA | | 1580.717 | | NA |
| ## | 15 | NA | | 940.4265 | | | NA | | 1760.799 | | NA |
| ## | 16 | NA | | 780.3539 | | | NA | | 1120.508 | | NA |
| ## | 17 | NA | | 820.3721 | | | NA | | 1180.535 | | NA |

quartile25Voiced quartile50 quartile50Voiced quartile75 quartile75Voiced

## roughness roughnessVoiced specCentroid specCentroidVoiced specSlope

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## | 1 | NA | | NA | NA | | NA | NA |
| ## | 2 | 30.57840 | | NA | 2857.224 | | NA | -2.423465 |
| ## | 3 | 29.35926 | | NA | 2329.046 | | NA | -3.926861 |
| ## | 4 | 28.14012 | | 28.14012 | 2017.306 | | 2017.306 | -2.784453 |
| ## | 5 | 26.92098 | | 26.92098 | 1828.534 | | 1828.534 | -3.026706 |
| ## | 6 | 25.68886 | | 25.68886 | 1980.161 | | 1980.161 | -2.328244 |
| ## | 7 | 24.45673 | | 24.45673 | 1708.333 | | 1708.333 | -2.954715 |
| ## | 8 | 23.22461 | | 23.22461 | 1776.728 | | 1776.728 | -2.267027 |
| ## | 9 | 21.99249 | | 21.99249 | 1857.271 | | 1857.271 | -3.544245 |
| ## | 10 | 23.00073 | | 23.00073 | 1755.249 | | 1755.249 | -2.063173 |
| ## | 11 | 24.00897 | | 24.00897 | 1644.465 | | 1644.465 | -2.893989 |
| ## | 12 | 25.01721 | | NA | 1677.069 | | NA | -2.318068 |
| ## | 13 | 26.02545 | | NA | 1491.745 | | NA | -3.156081 |
| ## | 14 | 26.71829 | | NA | 1496.201 | | NA | -4.636488 |
| ## | 15 | 27.41112 | | NA | 1768.751 | | NA | -4.633003 |
| ## | 16 | 28.10395 | | NA | 1374.779 | | NA | -2.928933 |
| ##  ## | 17 | 28.79679  specSlopeVoiced | | NA 1464.485  subDep subRatio voiced | | | NA | -3.271157 |
| ## | 1 | | NA | NA | NA | FALSE | | |
| ## | 2 | | NA | NA | NA | FALSE | | |
| ## | 3 | | NA | NA | NA | FALSE | | |
| ## | 4 | | -2.784453 | 0.6288563 | 4 | TRUE | | |
| ## | 5 | | -3.026706 | 0.8436867 | 3 | TRUE | | |
| ## | 6 | | -2.328244 | 0.4457848 | 3 | TRUE | | |
| ## | 7 | | -2.954715 | 0.2251028 | 3 | TRUE | | |
| ## | 8 | | -2.267027 | 0.7674297 | 3 | TRUE | | |
| ## | 9 | | -3.544245 | 0.6965205 | 3 | TRUE | | |
| ## | 10 | | -2.063173 | 0.2948627 | 2 | TRUE | | |
| ## | 11 | | -2.893989 | 0.8235727 | 4 | TRUE | | |
| ## | 12 | | NA | NA | NA | FALSE | | |
| ## | 13 | | NA | NA | NA | FALSE | | |
| ## | 14 | | NA | NA | NA | FALSE | | |
| ## | 15 | | NA | NA | NA | FALSE | | |
| ## | 16 | | NA | NA | NA | FALSE | | |
| ## | 17 | | NA | NA | NA | FALSE | | |
| ## |  | |  |  |  |  | | |
| ## | $summary | |  |  |  |  | | |
| ## |  | file duration duration\_noSilence voiced voiced\_noSilence amEnvDep\_mean | | | | | | |
| ## | 1 | sound 0.4702041 0.4248299 0.4705882 0.5 0.3437609 | | | | | | |
| ## |  | amEnvDep\_median amEnvDep\_sd amEnvDepVoiced\_mean amEnvDepVoiced\_median | | | | | | |
| ## | 1 | 0.3123318 0.168569 0.4858666 0.4884977 | | | | | | |
| ## |  | amEnvDepVoiced\_sd amEnvFreq\_mean amEnvFreq\_median amEnvFreq\_sd | | | | | | |
| ## | 1 | 0.1052894 23.88057 22.96717 7.159834 | | | | | | |
| ## |  | amEnvFreqVoiced\_mean amEnvFreqVoiced\_median amEnvFreqVoiced\_sd | | | | | | |
| ## | 1 | 19.06593 17.61192 5.07304 | | | | | | |
| ## |  | amEnvPurity\_mean amEnvPurity\_median amEnvPurity\_sd amEnvPurityVoiced\_mean | | | | | | |
| ## | 1 | -14.91595 -14.92733 0.3512125 -15.05626 | | | | | | |
| ## |  | amEnvPurityVoiced\_median amEnvPurityVoiced\_sd amMsFreq\_mean amMsFreq\_median | | | | | | |
| ## | 1 | -15.18122 0.3600383 89.47164 89.7096 | | | | | | |
| ## |  | amMsFreq\_sd amMsFreqVoiced\_mean amMsFreqVoiced\_median amMsFreqVoiced\_sd | | | | | | |
| ## | 1 | 10.52537 90.59343 95.89646 13.80128 | | | | | | |
| ## |  | amMsPurity\_mean amMsPurity\_median amMsPurity\_sd amMsPurityVoiced\_mean | | | | | | |
| ## | 1 | -15.80815 -15.58821 1.877904 -16.95752 | | | | | | |

|  |  |  |
| --- | --- | --- |
| ## |  | amMsPurityVoiced\_median amMsPurityVoiced\_sd ampl\_mean ampl\_median ampl\_sd |
| ## | 1 | -17.17108 1.520421 0.198789 0.2349771 0.1078482 |
| ## |  | ampl\_noSilence\_mean ampl\_noSilence\_median ampl\_noSilence\_sd amplVoiced\_mean |
| ## | 1 | 0.2112121 0.2354163 0.09802069 0.2830701 |
| ## |  | amplVoiced\_median amplVoiced\_sd CPP\_mean CPP\_median CPP\_sd dom\_mean |
| ## | 1 | 0.2787426 0.05078365 7.376841 7.488952 1.752948 NA |
| ## |  | dom\_median dom\_sd domVoiced\_mean domVoiced\_median domVoiced\_sd entropy\_mean |
| ## | 1 | NA NA NA NA NA 0.08937738 |
| ## |  | entropy\_median entropy\_sd entropyVoiced\_mean entropyVoiced\_median |
| ## | 1 | 0.040738 0.1588158 0.05570899 0.05767404 |
| ## |  | entropyVoiced\_sd f1\_freq\_mean f1\_freq\_median f1\_freq\_sd f1\_width\_mean |
| ## | 1 | 0.02087158 765.7075 762.045 101.8101 205.161 |
| ## |  | f1\_width\_median f1\_width\_sd f2\_freq\_mean f2\_freq\_median f2\_freq\_sd |
| ## | 1 | 201.6416 88.6342 1280.369 1301.42 121.1865 |
| ## |  | f2\_width\_mean f2\_width\_median f2\_width\_sd f3\_freq\_mean f3\_freq\_median |
| ## | 1 | 205.7873 165.523 132.0312 2844.095 2874.15 |
| ## |  | f3\_freq\_sd f3\_width\_mean f3\_width\_median f3\_width\_sd flux\_mean flux\_median |
| ## | 1 | 170.7554 197.7023 143.8952 159.9937 0.1243889 0.0003010412 |
| ## |  | flux\_sd fmDep\_mean fmDep\_median fmDep\_sd fmFreq\_mean fmFreq\_median |
| ## | 1 | 0.3306056 10.17145 10.17145 0 5.002269 5.002269 |
| ## |  | fmFreq\_sd fmPurity\_mean fmPurity\_median fmPurity\_sd harmEnergy\_mean |
| ## | 1 | 0 -3.925108 -3.930007 0.6293001 17.00513 |
| ## |  | harmEnergy\_median harmEnergy\_sd harmHeight\_mean harmHeight\_median |
| ## | 1 | 18.98024 8.876346 1846.395 1473.757 |
| ## |  | harmHeight\_sd HNR\_mean HNR\_median HNR\_sd HNRVoiced\_mean HNRVoiced\_median |
| ## | 1 | 1364.219 2.341444 2.702922 4.593559 5.846074 5.076918 |
| ## |  | HNRVoiced\_sd loudness\_mean loudness\_median loudness\_sd loudnessVoiced\_mean |
| ## | 1 | 2.770278 13.18764 14.75668 4.536396 16.55348 |
| ## |  | loudnessVoiced\_median loudnessVoiced\_sd novelty\_mean novelty\_median |
| ## | 1 | 16.89062 1.199424 -0.1572617 -0.2727931 |
| ## |  | novelty\_sd noveltyVoiced\_mean noveltyVoiced\_median noveltyVoiced\_sd |
| ## | 1 | 0.3369406 -0.1580978 -0.2785807 0.407383 |
| ## |  | peakFreq\_mean peakFreq\_median peakFreq\_sd peakFreqVoiced\_mean |
| ## | 1 | 874.1464 920.4174 236.8316 970.4401 |
| ## |  | peakFreqVoiced\_median peakFreqVoiced\_sd pitch\_mean pitch\_median pitch\_sd |
| ## | 1 | 950.431 263.9378 309.6178 264.9811 160.3923 |
| ## |  | quartile25\_mean quartile25\_median quartile25\_sd quartile25Voiced\_mean |
| ## | 1 | 742.8369 750.3403 108.0922 795.3607 |
| ## |  | quartile25Voiced\_median quartile25Voiced\_sd quartile50\_mean quartile50\_median |
| ## | 1 | 800.363 88.03343 1118.007 1050.476 |
| ## |  | quartile50\_sd quartile50Voiced\_mean quartile50Voiced\_median |
| ## | 1 | 240.095 1160.526 1170.531 |
| ## |  | quartile50Voiced\_sd quartile75\_mean quartile75\_median quartile75\_sd |
| ## | 1 | 151.632 2303.545 2361.071 765.6576 |
| ## |  | quartile75Voiced\_mean quartile75Voiced\_median quartile75Voiced\_sd |
| ## | 1 | 2526.146 2601.18 308.6386 |
| ## |  | roughness\_mean roughness\_median roughness\_sd roughnessVoiced\_mean |
| ## | 1 | 26.21525 26.37187 2.474632 24.67919 |
| ## |  | roughnessVoiced\_median roughnessVoiced\_sd specCentroid\_mean |
| ## | 1 | 24.23285 2.093295 1814.209 |
| ## |  | specCentroid\_median specCentroid\_sd specCentroidVoiced\_mean |
| ## | 1 | 1762 366.0675 1821.006 |
| ## |  | specCentroidVoiced\_median specCentroidVoiced\_sd specSlope\_mean |
| ## | 1 | 1802.631 128.3868 -3.072288 |

|  |  |  |
| --- | --- | --- |
| ## |  | specSlope\_median specSlope\_sd specSlopeVoiced\_mean specSlopeVoiced\_median |
| ## | 1 | -2.941824 0.7850023 -2.732819 -2.839221 |
| ## |  | specSlopeVoiced\_sd subDep\_mean subDep\_median subDep\_sd subRatio\_mean |
| ## | 1 | 0.4857588 0.590727 0.6626884 0.2403274 3.125 |
| ## |  | subRatio\_median subRatio\_sd |
| ## | 1 | 3 0.6408699 |

other\_features <- NULL

**for**(i **in** 1:length(mp3data)){

test\_analysis <- analyze(mp3data[i],pitchMethods = "autocor") other\_features$HNR\_mean[i] <- test\_analysis[["summary"]][["HNR\_mean"]] other\_features$HNR\_sd[i] <- test\_analysis[["summary"]][["HNR\_sd"]] other\_features$pitch\_mean[i] <- test\_analysis[["summary"]][["pitch\_mean"]] other\_features$pitch\_sd[i] <- test\_analysis[["summary"]][["pitch\_sd"]] other\_features$loudness\_mean[i] <- test\_analysis[["summary"]][["loudness\_mean"]] other\_features$loudness\_sd[i] <- test\_analysis[["summary"]][["loudness\_sd"]] other\_features$timbre\_mean[i] <- test\_analysis[["summary"]][["specCentroid\_mean"]] other\_features$timbre\_sd[i] <- test\_analysis[["summary"]][["specCentroid\_mean"]]

}

head(other\_features)

## $HNR\_mean

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ## | [1] | 2.34144446 | 0.89364337 | 3.62875011 | 1.29817023 | 6.95159675 | -0.25908897 |
| ## | [7] | -1.04398353 | 1.72410821 | -0.98130016 | 2.84577226 | 11.18711748 | -0.96891901 |
| ## | [13] | 5.32597419 | -0.10008125 | 5.71162565 | 2.41595457 | 6.10902023 | 0.28841276 |
| ## | [19] | 6.39700529 | 1.52025105 | 1.78962608 | -1.25756158 | 1.13925597 | 0.82203244 |
| ## | [25] | 0.67079158 | 9.17135382 | 1.63080697 | 4.73405777 | 4.55756161 | 0.30099782 |
| ## | [31] | 5.29702047 | 4.34215914 | 12.99764237 | 4.06408579 | 0.45714937 | 12.01776015 |
| ## | [37] | 6.65647212 | 7.33121992 | 6.86522821 | 5.90623735 | 8.02743039 | 4.38145564 |
| ## | [43] | 9.18408255 | 10.44124370 | 1.27210858 | 4.48119067 | 7.05145925 | 1.20052494 |
| ## | [49] | 2.28307370 | 10.11799004 | -0.12936190 | 2.79290150 | 1.02181365 | 0.99648126 |
| ## | [55] | 1.89116723 | 8.89279358 | 2.10065995 | 3.40723136 | 3.13313624 | 2.12377791 |
| ## | [61] | -0.03822236 | 2.59954394 | 2.26475891 | 5.45223875 | 1.14800604 | 1.49569665 |
| ## | [67] | 2.00441279 | 4.39655441 | 2.33687200 | 1.11316803 | -1.46946118 | 6.34040181 |
| ## | [73] | -2.51136950 | -1.95256100 | 2.35258096 | 4.04883745 | 5.77784982 | 0.60371241 |
| ## | [79] | 10.06675903 | 9.40895342 | 2.60731077 | 7.59160587 | 1.46707594 | 11.74070530 |
| ## | [85] | 5.44306392 | 7.52363479 | 10.00588904 | 6.00404008 | 8.54724259 | 1.93304301 |
| ## | [91] | 14.64858343 | 7.36330292 | 10.91137387 | 16.62534704 | 7.39438874 | 8.05743400 |
| ## | [97] | 10.65772884 | 10.80758390 | 11.17736903 | 6.99616228 | 10.02180943 | 5.55923126 |
| ## | [103] | 3.75423002 | 6.91487323 | 1.71434371 | 14.64910636 | 10.59414963 | 7.83736204 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## | [109] | 4.92117540 | | 0.62373061 | | 9.94627065 | | 2.98747579 | | 10.55254036 | | 5.76224627 | |
| ## | [115] | 7.05196352 | | 4.45960752 | | 1.17244660 | | 8.54925703 | | 4.04571680 | | 2.28660495 | |
| ## | [121] | 3.44843148 | | 10.65202599 | | 1.59220682 | | 2.76119298 | | 8.54127724 | | 5.19444228 | |
| ## | [127] | 1.86904053 | | 7.16312927 | | 4.43788836 | | 10.56409236 | | 4.74600462 | | 2.88415595 | |
| ## | [133] | -1.18258283 | | 1.48970851 | | 4.42988024 | | 5.06844051 | | 6.34912601 | | 1.40257452 | |
| ## | [139] | -0.94386189 | | 1.80495120 | | 8.70166246 | | 8.60598456 | | 1.84148588 | | 9.15618864 | |
| ## | [145] | 14.87258639 | | 16.67638254 | | 17.95293120 | | 11.30936583 | | 12.39349707 | | 8.34405324 | |
| ## | [151] | 9.72045175 | | 15.35146258 | | 13.08580517 | | 11.71970425 | | 13.50888513 | | -1.30701348 | |
| ## | [157] | 4.26817966 | | 2.42530143 | | 9.32116861 | | 7.58179394 | | 3.15283647 | | 3.90332391 | |
| ## | [163] | 4.01508556 | | 6.04997471 | | 8.87103578 | | 1.54971555 | | 3.91022948 | | 9.27353487 | |
| ## | [169] | 10.22427427 | | 16.43088095 | | 12.45244721 | | 11.43417587 | | 9.02167009 | | 3.04943907 | |
| ## | [175] | 6.68330865 | | 1.57521494 | | 10.96752416 | | 15.84750808 | | 10.31104184 | | 11.32243166 | |
| ## | [181] | 1.63533814 | | 10.31660836 | | 17.13564456 | | 6.17752245 | | 12.94463604 | | 4.67535483 | |
| ## | [187] | 4.57299162 | | 7.57719086 | | 11.06319554 | | 8.63614360 | | 2.92615947 | | 10.43851216 | |
| ## | [193] | 17.88243413 | | 8.63530985 | | 9.18332457 | | 3.54545035 | | 3.01568949 | | 9.09703584 | |
| ## | [199] | 5.16435992 | | 12.02528391 | | 15.27029915 | | 12.68252852 | | 9.31328684 | | 8.34515755 | |
| ## | [205] | 8.42216944 | | 6.85624171 | | 7.70526029 | | 6.04492097 | | 22.33636982 | | 6.52638725 | |
| ## | [211] | 13.18408840 | | 9.76092736 | | 9.89423186 | | 5.98709053 | | 4.37652622 | | 4.12941015 | |
| ## | [217] | 7.17568867 | | 12.93060194 | | 10.13892348 | | 9.51061184 | | 2.44378616 | | 2.37642799 | |
| ## | [223] | 18.58594280 | | 6.42463511 | | 3.71895411 | | 10.33105119 | | 6.17690888 | | 5.56005671 | |
| ## | [229] | 8.18092731 | | 5.64202705 | | 6.73374348 | | 0.81600810 | | 6.07391987 | | 9.06204617 | |
| ## | [235] | 2.14194124 | | 0.13659501 | | 10.27784228 | | -1.01084990 | | 6.75774328 | | 6.92819749 | |
| ## | [241] | 12.82533530 | | -2.69450584 | | 6.31611847 | | 5.81841543 | | -0.24916733 | | 8.70572179 | |
| ## | [247] | 8.71163000 | | 11.18989125 | | 0.33279154 | | 6.34869595 | | 4.27560978 | | 2.02019153 | |
| ## | [253] | 3.82367394 | | 16.30143738 | | 1.40781777 | | 9.75893478 | | 11.18017901 | | 0.98443252 | |
| ## | [259] | 7.58773879 | | 21.04494754 | |  | |  | |  | |  | |
| ## |  |  | |  | |  | |  | |  | |  | |
| ## | $HNR\_sd | | | | | | | | | | | | |
| ## | [1] | 4.593559 | 4.181848 | | 4.198140 | | 3.360105 | 4.845375 | 2.043730 | | 2.083252 | | 2.947025 |
| ## | [9] | 2.318224 | 3.232813 | | 8.656204 | | 1.638955 | 5.279800 | 2.755615 | | 3.499441 | | 2.457855 |
| ## | [17] | 2.565894 | 1.950757 | | 5.585960 | | 4.203671 | 2.901451 | 1.970970 | | 2.085904 | | 1.684014 |
| ## | [25] | 1.252462 | 2.356320 | | 4.225578 | | 1.964420 | 5.569207 | 2.798318 | | 2.540986 | | 3.426665 |
| ## | [33] | 6.682335 | 6.287103 | | 3.172005 | | 3.401868 | 3.874860 | 4.773053 | | 5.795060 | | 4.219255 |
| ## | [41] | 4.728638 | 2.864017 | | 5.291935 | | 5.214757 | 3.629829 | 3.831227 | | 4.292020 | | 3.068748 |
| ## | [49] | 3.442754 | 2.047784 | | 1.866061 | | 1.654422 | 1.196605 | 3.873182 | | 3.192104 | | 5.411282 |
| ## | [57] | 2.895552 | 3.423749 | | 3.986499 | | 2.568422 | 2.479388 | 2.459497 | | 4.775982 | | 5.003018 |
| ## | [65] | 2.923388 | 4.311697 | | 3.631216 | | 3.415738 | 3.885144 | 3.423379 | | 3.563817 | | 6.739807 |
| ## | [73] | 5.522813 | 2.848050 | | 3.060519 | | 2.211385 | 9.262284 | 4.999496 | | 6.376383 | | 6.482667 |
| ## | [81] | 3.659146 | 4.998604 | | 5.597198 | | 5.627551 | 4.180801 | 5.763267 | | 4.985713 | | 4.835480 |
| ## | [89] | 3.546400 | 2.926647 | | 6.534086 | | 4.493082 | 4.923783 | 6.414025 | | 7.377563 | | 4.213212 |
| ## | [97] | 6.295348 | 7.822340 | | 5.275589 | | 4.593064 | 4.337537 | 4.478383 | | 5.095948 | | 4.643641 |
| ## | [105] | 3.765432 | 5.444530 | | 4.071493 | | 4.664607 | 5.013416 | 2.456754 | | 5.709401 | | 4.751675 |
| ## | [113] | 5.392789 | 4.196867 | | 5.676676 | | 4.492840 | 4.005036 | 7.223818 | | 4.774634 | | 3.205499 |
| ## | [121] | 5.877220 | 5.778098 | | 3.152010 | | 2.030766 | 4.520730 | 3.354151 | | 2.768897 | | 4.882091 |
| ## | [129] | 5.632755 | 6.114424 | | 6.117638 | | 4.756672 | 2.930253 | 2.821331 | | 5.020341 | | 5.473197 |
| ## | [137] | 5.047611 | 2.254013 | | 1.788420 | | 2.171451 | 5.377707 | 5.457229 | | 4.273368 | | 5.288013 |
| ## | [145] | 6.391616 | 5.304081 | | 7.157151 | | 5.906676 | 7.585616 | 4.451293 | | 5.777282 | | 4.595082 |
| ## | [153] | 5.050908 | 6.832778 | | 6.375548 | | 2.448624 | 4.230325 | 5.182898 | | 6.214423 | | 6.879317 |
| ## | [161] | 3.453758 | 2.473552 | | 2.178324 | | 3.970035 | 5.435711 | 4.819032 | | 3.845275 | | 6.109594 |
| ## | [169] | 6.212223 | 4.395343 | | 4.911580 | | 5.405234 | 4.928645 | 7.518484 | | 5.526831 | | 4.699621 |
| ## | [177] | 6.028359 | 6.511300 | | 5.708827 | | 5.779034 | 4.317720 | 6.195464 | | 6.108453 | | 4.528553 |
| ## | [185] | 5.823295 | 4.135196 | | 4.318882 | | 3.231292 | 4.198903 | 4.759316 | | 5.082346 | | 4.032914 |
| ## | [193] | 5.895443 | 8.191195 | | 7.704440 | | 5.822712 | 4.013798 | 4.807424 | | 2.725648 | | 5.290943 |
| ## | [201] | 6.685975 | 4.805363 | | 3.170099 | | 5.943690 | 6.100176 | 6.750154 | | 3.030684 | | 7.365156 |

|  |  |
| --- | --- |
| ## | [209] 3.364931 8.782710 3.398921 4.917003 5.883960 8.021371 5.822156 4.442585 |
| ## | [217] 7.242708 7.403632 6.355175 4.056218 4.016297 4.864279 1.903794 3.955029 |
| ## | [225] 6.877141 6.776966 6.454117 7.109510 7.826544 7.676950 4.548089 3.629239 |
| ## | [233] 6.305280 5.788498 4.494722 2.446032 4.242965 3.458983 2.711603 3.757852 |
| ## | [241] 6.563888 3.556210 4.618186 5.960265 2.605144 5.706903 4.943911 4.160405 |
| ## | [249] 3.508916 6.383587 3.595741 2.618918 5.569292 5.430033 3.620993 5.518692 |
| ## | [257] 4.720700 2.512609 3.415204 8.436318 |

##

## $pitch\_mean

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## | [1] | 309.6178 | 702.6449 | | 2898.0304 | | 1335.8531 | 314.1920 | 2032.2581 | 1780.3970 |
| ## | [8] | 928.2045 | 334.7690 | | 1296.4783 | | 2335.6907 | NA | 841.5436 | 325.5011 |
| ## | [15] | 875.5790 | 1396.4891 | | 1229.6469 | | 349.2936 | 370.5103 | 305.7996 | 298.7456 |
| ## | [22] | NA | 928.1514 | | NA | | NA | 124.8928 | 173.5598 | 319.6427 |
| ## | [29] | 325.1391 | 178.8044 | | 542.1401 | | 986.3447 | 427.5708 | 945.0756 | 822.5242 |
| ## | [36] | 237.5413 | 280.3058 | | 250.8975 | | 397.5392 | 191.4009 | 294.9297 | 667.5248 |
| ## | [43] | 337.6340 | 366.2767 | | 142.3790 | | 205.3102 | 195.0411 | 613.4454 | 144.3727 |
| ## | [50] | 223.7407 | NA | | 2769.1172 | | NA | 408.3767 | 432.7315 | 475.1523 |
| ## | [57] | 356.7344 | 422.0789 | | 504.0763 | | 649.6514 | 312.7925 | 409.0989 | 667.1095 |
| ## | [64] | 633.9159 | 440.1808 | | 571.8221 | | 302.8476 | 305.9023 | 458.2257 | 375.3259 |
| ## | [71] | 286.3636 | 436.7166 | | 405.9341 | | NA | 755.3701 | 334.8409 | 572.8897 |
| ## | [78] | 223.4337 | 477.2845 | | 310.6847 | | 688.4161 | 372.1710 | 498.9591 | 611.2723 |
| ## | [85] | 134.3696 | 429.4504 | | 1719.1596 | | 991.1545 | 1409.2517 | 552.4907 | 1089.3618 |
| ## | [92] | 1020.8519 | 1117.2708 | | 1701.1450 | | 1068.2603 | 1468.6579 | 1413.9283 | 2325.3327 |
| ## | [99] | 1926.6085 | 1413.1649 | | 1028.6389 | | 383.3488 | 314.8590 | 909.6249 | 546.2446 |
| ## | [106] | 1221.7901 | 315.8161 | | 1251.4781 | | 436.5812 | 1679.6526 | 1848.9563 | 577.9721 |
| ## | [113] | 512.8323 | 1031.0217 | | 376.0592 | | 998.9226 | 184.1405 | 513.1692 | 577.0196 |
| ## | [120] | 515.5769 | 367.2240 | | 720.2464 | | 583.8109 | 647.2144 | 967.3498 | 529.2060 |
| ## | [127] | 443.5475 | 351.9784 | | 707.4171 | | 932.3180 | 503.2322 | 701.3987 | 347.6001 |
| ## | [134] | 274.3850 | 764.2273 | | 533.8172 | | 447.2799 | 916.2233 | NA | 150.6835 |
| ## | [141] | 1847.8391 | 1077.4944 | | 413.4936 | | 1065.4339 | 824.1791 | 648.0524 | 1734.8320 |
| ## | [148] | 756.2365 | 560.9095 | | 1187.8104 | | 468.0636 | 679.7856 | 1219.2164 | 758.7671 |
| ## | [155] | 571.1352 | 373.7288 | | 345.1450 | | 429.7803 | 1177.0185 | 653.9529 | 406.0053 |
| ## | [162] | 523.4189 | 288.1136 | | 477.5398 | | 1210.0456 | 300.2547 | 810.1672 | 644.7247 |
| ## | [169] | 563.5571 | 344.3234 | | 353.5853 | | 440.6060 | 264.8613 | 263.1247 | 1040.6407 |
| ## | [176] | 408.6509 | 871.8580 | | 912.7572 | | 716.7661 | 826.0020 | 648.8566 | 1638.8332 |
| ## | [183] | 1229.1876 | 789.8754 | | 994.5584 | | 886.0514 | 727.6059 | 212.2156 | 1555.5090 |
| ## | [190] | 616.7716 | 484.2566 | | 805.7139 | | 928.8191 | 893.3045 | 933.0338 | 300.5020 |
| ## | [197] | 158.4874 | 644.9237 | | 237.1752 | | 417.9841 | 738.8945 | 629.8705 | 331.6487 |
| ## | [204] | 360.8601 | 269.0745 | | 1227.9386 | | 779.8318 | 494.3915 | 921.1874 | 524.9995 |
| ## | [211] | 469.2953 | 286.1266 | | 692.2243 | | 334.4190 | 423.5517 | 598.1062 | 510.0577 |
| ## | [218] | 592.5732 | 412.8748 | | 243.8807 | | 984.2478 | 253.4818 | 829.0908 | 986.8190 |
| ## | [225] | 581.8976 | 372.1568 | | 604.1522 | | 502.2343 | 543.1004 | 481.5705 | 413.4580 |
| ## | [232] | 562.1465 | 286.4093 | | 557.5064 | | 456.2183 | 146.2765 | 514.0202 | 133.6210 |
| ## | [239] | 157.6798 | 286.1956 | | 289.3233 | | 3039.7022 | 198.8364 | 290.5423 | 141.3490 |
| ## | [246] | 270.9996 | 222.4504 | | 285.3577 | | 515.6536 | 665.1540 | 471.7119 | 948.4370 |
| ## | [253] | 510.0632 | 1228.3645 | | 599.1376 | | 595.5261 | 1110.6589 | 693.8377 | 1825.9719 |
| ## | [260] | 1325.9977 |  | |  | |  |  |  |  |
| ## |  |  |  | |  | |  |  |  |  |
| ## | $pitch\_sd | | |  | |  | |  | | |
| ## | [1] 160.3922779 | | | 41.4663009 | | 297.8463151 | | 578.8256907 56.4449274 | | |
| ## | [6] NA | | | NA | | 285.7123886 | | 120.9285615 398.8485809 | | |
| ## | [11] 129.5252044 | | | NA | | 290.1245551 | | 5.0958834 417.0137871 | | |
| ## | [16] 250.3427882 | | | 201.0352992 | | 78.1969279 | | 19.4938407 73.2353820 | | |
| ## | [21] 192.4438285 | | | NA | | 421.6497037 | | NA NA | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ## | [26] | 18.0842509 | 10.2640193 | 84.4019963 | 18.4750292 | 6.9771052 |
| ## | [31] | 348.9340991 | 723.1174200 | 22.5401458 | 490.4870066 | 612.3653199 |
| ## | [36] | 25.6720065 | 177.4531008 | 30.5580480 | 130.4581441 | 86.6280945 |
| ## | [41] | 49.0589601 | 100.9983670 | 18.6922678 | 83.6113191 | 7.3417330 |
| ## | [46] | 119.4520740 | 62.8172261 | 279.9858344 | 28.9831540 | 63.7775456 |
| ## | [51] | NA | 52.0668542 | NA | 160.9453340 | 93.5492159 |
| ## | [56] | 160.9906295 | 106.4654548 | 23.9246148 | 384.2128119 | 207.8593890 |
| ## | [61] | 7.7982927 | 117.2052232 | 380.3287750 | 91.5049264 | 105.2450497 |
| ## | [66] | 298.3185309 | 34.6688011 | 8.6987874 | 163.7671899 | 2.2586853 |
| ## | [71] | NA | 47.9059734 | 21.2481803 | NA | 397.2372459 |
| ## | [76] | 93.8618698 | 67.7070831 | 9.8083204 | 169.2474149 | 93.5529201 |
| ## | [81] | 280.7663686 | 85.3590837 | 92.2895084 | 151.4809017 | 1.7879643 |
| ## | [86] | 26.9077868 | 664.6642761 | 174.1803600 | 176.1228878 | 182.8508984 |
| ## | [91] | 258.9578606 | 448.3990477 | 273.0491003 | 349.4611087 | 246.2699663 |
| ## | [96] | 719.3394773 | 479.5202426 | 380.3473218 | 446.1862932 | 232.1951620 |
| ## | [101] | 136.7028356 | 94.3018521 | 99.8619931 | 208.7205252 | 194.4644025 |
| ## | [106] | 52.3106964 | 75.3455901 | 150.6347507 | 137.1190903 | NA |
| ## | [111] | 338.7563943 | 136.0305453 | 66.3812548 | 306.9167940 | 81.8421132 |
| ## | [116] | 537.4518869 | 36.4928152 | 17.8504070 | 357.6254862 | 467.3118959 |
| ## | [121] | 42.3300213 | 79.5751815 | 436.6722259 | 1078.6958504 | 721.0541732 |
| ## | [126] | 215.1326976 | 291.0499760 | 54.1285972 | 198.4807671 | 97.9774648 |
| ## | [131] | 170.2114033 | 234.3267611 | 59.2244840 | 66.5841301 | 421.7217033 |
| ## | [136] | 265.6528056 | 196.9443802 | 1034.2269018 | NA | 66.9557493 |
| ## | [141] | 491.9831488 | 307.4121466 | 101.3012903 | 373.1648863 | 73.4840229 |
| ## | [146] | 39.7300693 | 239.4936406 | 157.5554548 | 72.6356580 | 416.0226830 |
| ## | [151] | 116.7454629 | 98.9197149 | 397.5117029 | 65.6323823 | 328.3326936 |
| ## | [156] | NA | 96.0314500 | 184.6122542 | 191.7540311 | 263.6770076 |
| ## | [161] | 162.7147746 | 283.7858112 | 31.1776310 | 146.2303143 | 116.7602435 |
| ## | [166] | 122.9262035 | 205.4160468 | 157.1670813 | 204.6662376 | 15.6460443 |
| ## | [171] | 166.0729061 | 10.7924530 | 117.3749601 | 13.4801663 | 237.0702747 |
| ## | [176] | 178.1897565 | 343.4590576 | 38.5906863 | 227.7488960 | 99.2258929 |
| ## | [181] | 16.0581030 | 511.6429688 | 112.0911652 | 147.8981113 | 208.9050174 |
| ## | [186] | 252.7314747 | 83.2909116 | 74.2281619 | 446.9439029 | 123.4292445 |
| ## | [191] | 181.6554032 | 109.1262915 | 58.0062502 | 174.2035638 | 140.2547889 |
| ## | [196] | 14.7695833 | 13.7401212 | 51.3213125 | 38.6699057 | 128.9934146 |
| ## | [201] | 206.7072984 | 82.8782009 | 41.3047054 | 325.0069951 | 95.0072521 |
| ## | [206] | 1110.1236281 | 950.7709492 | 91.1626384 | 143.8428743 | 252.0064762 |
| ## | [211] | 144.0933293 | 70.1423452 | 164.8384356 | 23.6974943 | 377.6776734 |
| ## | [216] | 386.0710460 | 62.5909634 | 385.7819999 | 109.8765213 | 76.2243143 |
| ## | [221] | 776.6054791 | 54.3948922 | 549.9304349 | 699.3867575 | 129.5517110 |
| ## | [226] | 57.4534485 | 319.9780179 | 152.2336290 | 120.0663236 | 153.2375629 |
| ## | [231] | 178.0045857 | 250.4375795 | 47.8283116 | 86.5234305 | 153.7989198 |
| ## | [236] | 34.3046980 | 824.6634032 | 10.0876914 | 79.2812301 | 155.6404509 |
| ## | [241] | 17.1593171 | NA | 67.0500249 | 462.1885934 | 0.7821845 |
| ## | [246] | 50.9497386 | 10.4790652 | 35.3503222 | 311.7266977 | 129.9946387 |
| ## | [251] | 123.3819208 | 236.7472902 | 212.6566434 | 83.7892878 | 185.0085987 |
| ## | [256] | 171.7682819 | 78.9044411 | 242.8448177 | 119.8972442 | 70.6458040 |
| ## |  |  |  |  |  |  |
| ## | $loudness\_mean | | | |  | |
| ## | [1] 13.187642 14.548103 14.748279 13.970329 | | | | 12.536269 13.129966 13.047846 | |
| ## | [8] 12.689246 14.578573 12.994702 12.478493 | | | | 14.572311 11.387938 13.008484 | |
| ## | [15] 11.814229 13.183581 13.460977 14.010833 | | | | 13.842747 14.347838 13.239298 | |
| ## | [22] 14.108519 12.857596 15.421878 15.858925 | | | | 11.936551 12.407243 12.024907 | |
| ## | [29] 15.642305 16.743317 14.586455 15.220929 | | | | 11.337358 12.333045 14.634020 | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## | [36] | 12.555560 | 13.552423 | 12.154052 | 12.616858 | 11.951039 | 14.042211 | 13.122992 |
| ## | [43] | 12.274536 | 10.808337 | 15.740572 | 14.463364 | 14.901982 | 10.708294 | 13.817535 |
| ## | [50] | 12.051796 | 17.005012 | 17.527059 | 14.191130 | 12.622178 | 15.696419 | 13.702182 |
| ## | [57] | 12.055071 | 14.080559 | 13.236329 | 12.235671 | 12.838094 | 11.633583 | 13.111867 |
| ## | [64] | 11.869246 | 11.857704 | 12.816712 | 13.836985 | 15.285724 | 15.280843 | 14.694749 |
| ## | [71] | 14.642000 | 14.228513 | 15.308999 | 15.895459 | 15.859056 | 12.498551 | 12.106036 |
| ## | [78] | 13.329658 | 11.368237 | 13.132779 | 14.913191 | 14.321765 | 11.430539 | 10.124967 |
| ## | [85] | 14.086061 | 13.113475 | 10.824552 | 11.211834 | 9.330792 | 11.731683 | 10.265768 |
| ## | [92] | 9.806094 | 11.337481 | 10.755171 | 12.272453 | 11.620606 | 11.696177 | 11.776697 |
| ## | [99] | 10.615688 | 10.126886 | 10.385464 | 12.151988 | 13.985433 | 14.062714 | 11.914658 |
| ## | [106] | 9.271640 | 11.697878 | 11.931503 | 13.481798 | 13.038065 | 10.753995 | 13.038186 |
| ## | [113] | 12.191092 | 12.578628 | 12.499946 | 13.483760 | 14.859871 | 11.520473 | 13.008853 |
| ## | [120] | 15.095645 | 13.360468 | 9.953833 | 15.986109 | 13.906877 | 14.113887 | 13.719804 |
| ## | [127] | 14.496243 | 13.743613 | 13.308817 | 11.753301 | 12.259957 | 13.162820 | 16.833731 |
| ## | [134] | 19.745188 | 12.232216 | 11.164114 | 12.346306 | 14.700523 | 13.541187 | 12.436123 |
| ## | [141] | 11.541688 | 11.024682 | 14.814313 | 12.150812 | 10.803888 | 12.936119 | 11.081223 |
| ## | [148] | 10.542689 | 11.540591 | 10.996823 | 11.471262 | 12.587886 | 10.846394 | 11.908977 |
| ## | [155] | 12.495320 | 15.002256 | 13.766677 | 12.630704 | 12.605195 | 11.115765 | 12.985188 |
| ## | [162] | 11.760313 | 12.994009 | 14.332661 | 11.084819 | 13.845716 | 13.869585 | 12.251233 |
| ## | [169] | 11.492696 | 7.643426 | 10.839009 | 11.925277 | 12.634005 | 11.933850 | 11.770588 |
| ## | [176] | 13.287436 | 12.494254 | 10.432539 | 9.947592 | 13.402008 | 14.576724 | 11.894482 |
| ## | [183] | 8.950613 | 12.194169 | 10.201996 | 11.776340 | 13.285621 | 10.887546 | 11.997348 |
| ## | [190] | 11.376573 | 13.621814 | 9.779219 | 9.710514 | 10.511090 | 11.513152 | 14.550919 |
| ## | [197] | 14.077180 | 14.313774 | 15.179351 | 12.270833 | 10.948096 | 15.940197 | 9.724881 |
| ## | [204] | 13.220651 | 11.306124 | 11.422825 | 11.350796 | 12.834927 | 10.267022 | 13.563036 |
| ## | [211] | 12.437958 | 14.681191 | 11.927975 | 11.130883 | 14.194861 | 15.044798 | 13.244197 |
| ## | [218] | 10.946265 | 11.184000 | 10.693432 | 15.479496 | 13.724393 | 11.991208 | 15.681402 |
| ## | [225] | 13.585348 | 15.030110 | 12.499045 | 12.332596 | 11.774986 | 11.902792 | 13.016579 |
| ## | [232] | 13.169228 | 13.585516 | 11.747382 | 13.457691 | 15.833262 | 10.585887 | 15.296789 |
| ## | [239] | 13.387444 | 12.672041 | 9.377702 | 15.988799 | 11.630914 | 13.414103 | 14.330704 |
| ## | [246] | 13.756274 | 11.570571 | 12.714613 | 13.085764 | 11.980392 | 13.069311 | 11.148547 |
| ## | [253] | 11.978311 | 11.240519 | 12.294862 | 10.996912 | 10.887910 | 11.798282 | 12.280512 |
| ## | [260] | 10.502115 |  |  |  |  |  |  |
| ##  ## | $loudness\_sd | |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## | [1] | 4.536396 | 2.998346 | 5.605556 | 3.931089 | 5.000831 | 1.967018 | 2.921836 | 2.726894 |
| ## | [9] | 2.325996 | 4.374256 | 3.683564 | 3.772957 | 2.701599 | 3.614112 | 2.797551 | 1.454052 |
| ## | [17] | 1.527002 | 2.767281 | 3.586004 | 3.921614 | 3.382370 | 2.815520 | 3.267017 | 4.800004 |
| ## | [25] | 5.156314 | 2.807255 | 5.045756 | 2.488697 | 4.977996 | 6.092454 | 4.162488 | 4.331300 |
| ## | [33] | 3.625187 | 4.113685 | 4.155449 | 2.969460 | 4.886115 | 3.173025 | 2.578372 | 3.663745 |
| ## | [41] | 2.717027 | 4.682658 | 3.756762 | 2.666354 | 5.747981 | 3.969800 | 4.372502 | 3.934498 |
| ## | [49] | 5.704505 | 3.677017 | 6.838360 | 6.709050 | 5.312556 | 3.801543 | 5.881962 | 4.095182 |
| ## | [57] | 2.736938 | 5.102157 | 3.241423 | 4.298821 | 3.395980 | 1.665571 | 3.722882 | 3.822110 |
| ## | [65] | 3.862947 | 3.910850 | 5.307578 | 4.743641 | 6.689411 | 4.499103 | 6.826120 | 5.385804 |
| ## | [73] | 5.304568 | 4.770766 | 4.670279 | 3.584591 | 2.707103 | 4.696655 | 4.470775 | 4.043093 |
| ## | [81] | 4.897547 | 3.326895 | 5.397346 | 3.913120 | 6.373938 | 3.163118 | 3.646920 | 2.695329 |
| ## | [89] | 1.329058 | 2.241269 | 1.794783 | 3.402369 | 4.226500 | 4.225528 | 4.408258 | 3.146068 |
| ## | [97] | 2.565592 | 2.771211 | 3.175148 | 2.913732 | 3.378633 | 2.769628 | 6.072259 | 3.873754 |
| ## | [105] | 3.831116 | 3.294259 | 5.118415 | 3.631248 | 3.747032 | 3.499415 | 3.986900 | 5.126348 |
| ## | [113] | 5.161678 | 4.847618 | 4.235497 | 4.128655 | 4.752939 | 4.807808 | 4.958077 | 4.628732 |
| ## | [121] | 5.521667 | 3.996370 | 6.391466 | 5.009686 | 6.364754 | 5.255926 | 6.132361 | 4.729273 |
| ## | [129] | 8.196743 | 5.415248 | 4.459753 | 3.745988 | 6.577563 | 7.233634 | 2.475431 | 5.066924 |
| ## | [137] | 4.414653 | 2.756754 | 2.732550 | 3.909586 | 3.339323 | 2.156338 | 2.133762 | 2.255168 |
| ## | [145] | 3.897836 | 2.719302 | 2.080512 | 3.797569 | 3.100123 | 2.933307 | 2.748296 | 1.983436 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ## | [153] | 3.575657 | 4.033078 | 1.692733 | 4.178552 | 5.022387 | 3.211994 | 4.185980 | 3.138751 |
| ## | [161] | 3.430463 | 3.058086 | 1.555194 | 2.846320 | 4.050944 | 4.543005 | 2.914649 | 2.796439 |
| ## | [169] | 3.167958 | 2.140487 | 3.783152 | 2.336303 | 3.236942 | 3.459256 | 2.020133 | 3.282998 |
| ## | [177] | 2.469778 | 2.492052 | 4.325401 | 2.540994 | 5.446356 | 2.736567 | 1.755182 | 1.926700 |
| ## | [185] | 3.503699 | 4.572690 | 5.218970 | 4.109130 | 2.861582 | 5.024403 | 3.529995 | 3.125587 |
| ## | [193] | 2.438787 | 3.176545 | 4.563440 | 3.650259 | 4.481350 | 3.546778 | 4.589157 | 4.113768 |
| ## | [201] | 4.334748 | 7.136049 | 5.039791 | 5.148197 | 3.678735 | 5.059572 | 3.608952 | 5.022636 |
| ## | [209] | 2.871730 | 4.576740 | 3.321594 | 5.933077 | 5.703955 | 4.639747 | 5.434366 | 6.128011 |
| ## | [217] | 5.922449 | 4.846352 | 3.693153 | 4.053732 | 5.025303 | 5.194268 | 5.708391 | 4.354377 |
| ## | [225] | 5.610603 | 5.185140 | 4.972188 | 4.840182 | 4.308647 | 3.779778 | 4.061278 | 4.023254 |
| ## | [233] | 3.329592 | 1.911506 | 2.710450 | 3.772057 | 3.117397 | 4.174117 | 3.243787 | 3.965329 |
| ## | [241] | 2.740594 | 5.841552 | 3.182005 | 4.063824 | 4.780066 | 4.080714 | 3.139688 | 4.006018 |
| ## | [249] | 1.606765 | 3.317838 | 3.894694 | 2.091554 | 1.082919 | 2.070089 | 1.879753 | 3.347378 |
| ## | [257] | 1.652824 | 3.070277 | 1.633211 | 2.321709 |  |  |  |  |

1. Append all extracted features to the ratings dataset. Then, split the dataset in a 80% training and 20% holdout set.

ratings$jitter <- Jitter ratings$HNR\_mean <- other\_features$mean ratings$HNR\_sd <- other\_features$sd

ratings$pitch\_mean <- other\_features$pitch\_mean ratings$pitch\_sd <- other\_features$pitch\_sd ratings$loudness\_mean <- other\_features$loudness\_mean ratings$loudness\_sd <- other\_features$loudness\_sd ratings$timbre\_mean <- other\_features$timbre\_mean ratings$timbre\_sd <- other\_features$timbre\_sd

*#splitting the data into 80/20*

[*#https://www.listendata.com/2015/02/splitting-data-into-training-and-test.html*](http://www.listendata.com/2015/02/splitting-data-into-training-and-test.html)

rating\_data = sort(sample(nrow(ratings), nrow(ratings)\*0.8))

training <- ratings[rating\_data,] testing <- ratings[-rating\_data,]