Estimations of Quantitative Features

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Description

This file contains the code for estimating the feature values (TTR, unigram entropy, entropy rate, repetition rate) per character chunk (one per line) for each file in the NaLaFi/samples folder. The estimations are saved one per line in a csv file in NaLaFi/results/features.csv.

Load libraries

If the libraries are not installed yet, you need to install them using, for example, the command: install.packages("ggplot2"). For the Hrate package this is different, since it comes from github. The devtools library needs to be installed, and then the install_github() function is used.

```
library(stringr)
library(entropy)
library(gsubfn)
```

```
## Loading required package: proto
```

```
#library(devtools)
#install_github("dimalik/Hrate")
library(Hrate)
```

List files

Create list with all the files in the directory "data".

```
# give the path to folder with files
file.list <- list.files(path = "~/Github/NaLaFi/samples",
                        recursive = T, full.names = T)
head(file.list)
```

```
## [1] "/home/chris/Github/NaLaFi/samples/10_non-writing_animal_bhg_0001.txt"
## [2] "/home/chris/Github/NaLaFi/samples/10_non-writing_animal_bhg_0002.txt"
## [3] "/home/chris/Github/NaLaFi/samples/10_non-writing_animal_bhg_0003.txt"
## [4] "/home/chris/Github/NaLaFi/samples/10_non-writing_animal_bhg_0004.txt"
## [5] "/home/chris/Github/NaLaFi/samples/10_non-writing_animal_bhg_0005.txt"
## [6] "/home/chris/Github/NaLaFi/samples/10_non-writing_animal_bhg_0006.txt"
```

```
length(file.list)
```

```
## [1] 1050
```

Estimations per file

```r
# set counter
counter = 0
# initialize dataframe to append results to
estimations.df <- data.frame(filename = character(0), corpus = character(0),
                             subcorpus = character(0), num.char = numeric(0),
                             chunk.num = numeric(0), huni.chars = numeric (0),
                             hrate.chars = numeric(0), ttr.chars = numeric(0),
                             rm.chars = numeric(0))

# start time
start_time <- Sys.time()
for (file in file.list){
  try({ # if the processing fails for a certain file, there will be no output for this file,
  # but the try() function allows the loop to keep running

  # basic processing
  # loading textfile
  textfile <- scan(file, what = "char", quote = "", comment.char = "",
                   encoding = "UTF-8", sep = "\n" , skip = 0)
  # print(head(textfile))
  # get filename
  filename <- basename(file)
  print(filename) # for visual inspection
  # get corpus info
  corpus <- word(filename, 2, sep = "\\_")
  # get subcorpus info
  subcorpus <- word(filename, 3, sep = "\\_")
  #get character chunk size
  num.char <- word(filename, 1, sep = "\\_")

  # initizalized chunk count
  chunk.num = 0

  for (chunk in textfile){
    chunk.num = chunk.num + 1
    # split chunk into characters
    chars <- unlist(strsplit(chunk, ""))

    # unigram entropy estimation
    # calculate unigram entropy for characters
    chars.df <- as.data.frame(table(chars))
    # print(chars.df)
    huni.chars <- entropy(chars.df$Freq, method = "ML", unit = "log2")

    # entropy rate estimation
    # the values chosen for max.length and every.word will crucially
    # impact processing time. In case of "max.length = NULL" the length is n units
    # here use the try() function since entropy rate estimation can fail when particular
    # special characters are in the strings
    hrate.chars <- try(get.estimate(text = chars, every.word = 1, max.length = NULL))
    if (class(hrate.chars) == "numeric") {
```

```r
    hrate.chars <- hrate.chars
  } else {
    hrate.chars = "NA"
  }

  # calculate type-token ratio (ttr)
  ttr.chars <- nrow(chars.df)/sum(chars.df$Freq)

  # calculate repetition measure according to Sproat (2014)
  # the maximum number of adjacent repetitions "R" possible is the sum of frequency counts minus 1.
  R <- sum(chars.df$Freq)-1
  # calculate the number of adjacent repetitions "r"
  r = 0
  if (length(chars) > 1){
    for (i in 1:(length(chars)-1)){
      if (chars[i] == chars[i+1]){
        r = r + 1
      } else {
        r = r + 0
      }
    }
    # calculate the repetition measure
    rm.chars <- r/R
  } else {
    rm.chars <- "NA"
  }

  # append results to dataframe
  local.df <- data.frame(filename, corpus, subcorpus, num.char, chunk.num,
                         huni.chars, hrate.chars, ttr.chars, rm.chars)
  estimations.df <- rbind(estimations.df, local.df)
  }
  })
   # counter
  counter <- counter + 1
  print(counter)
}
```

```
## [1] "10_non-writing_animal_bhg_0001.txt"
## [1] 1
## [1] "10_non-writing_animal_bhg_0002.txt"
## [1] 2
## [1] "10_non-writing_animal_bhg_0003.txt"
## [1] 3
## [1] "10_non-writing_animal_bhg_0004.txt"
## [1] 4
## [1] "10_non-writing_animal_bhg_0005.txt"
## [1] 5
## [1] "10_non-writing_animal_bhg_0006.txt"
## [1] 6
## [1] "10_non-writing_animal_bhg_0007.txt"
## [1] 7
## [1] "10_non-writing_animal_bhg_0008.txt"
## [1] 8
```

```
## [1] "10_non-writing_animal_bhg_0009.txt"
## [1] 9
## [1] "10_non-writing_animal_bhg_0010.txt"
## [1] 10
## [1] "10_non-writing_animal_cad_0001.txt"
## [1] 11
## [1] "10_non-writing_animal_cad_0002.txt"
## [1] 12
## [1] "10_non-writing_animal_cav_0001.txt"
## [1] 13
## [1] "10_non-writing_animal_cav_0002.txt"
## [1] 14
## [1] "10_non-writing_animal_cav_0003.txt"
## [1] 15
## [1] "10_non-writing_animal_cav_0004.txt"
## [1] 16
## [1] "10_non-writing_animal_cav_0005.txt"
## [1] 17
## [1] "10_non-writing_animal_cav_0006.txt"
## [1] 18
## [1] "10_non-writing_animal_cav_0007.txt"
## [1] 19
## [1] "10_non-writing_animal_cav_0008.txt"
## [1] 20
## [1] "10_non-writing_animal_cav_0009.txt"
## [1] 21
## [1] "10_non-writing_animal_cth_0001.txt"
## [1] 22
## [1] "10_non-writing_animal_cth_0002.txt"
## [1] 23
## [1] "10_non-writing_animal_cth_0003.txt"
## [1] 24
## [1] "10_non-writing_animal_cth_0004.txt"
## [1] 25
## [1] "10_non-writing_animal_cth_0005.txt"
## [1] 26
## [1] "10_non-writing_animal_cth_0006.txt"
## [1] 27
## [1] "10_non-writing_animal_cth_0007.txt"
## [1] 28
## [1] "10_non-writing_animal_cth_0008.txt"
## [1] 29
## [1] "10_non-writing_animal_cth_0009.txt"
## [1] 30
## [1] "10_non-writing_animal_cth_0010.txt"
## [1] 31
## [1] "10_non-writing_animal_cth_0011.txt"
## [1] 32
## [1] "10_non-writing_animal_zfi_0001.txt"
## [1] 33
## [1] "10_non-writing_heraldics_bla_0001.txt"
## [1] 34
## [1] "10_non-writing_heraldics_bla_0002.txt"
## [1] 35
```

```
## [1] "10_non-writing_heraldics_bla_0003.txt"
## [1] 36
## [1] "10_non-writing_morse_moc_0001.txt"
## [1] 37
## [1] "10_non-writing_morse_moc_0002.txt"
## [1] 38
## [1] "10_non-writing_morse_moc_0003.txt"
## [1] 39
## [1] "10_non-writing_morse_moc_0004.txt"
## [1] 40
## [1] "10_non-writing_morse_moc_0005.txt"
## [1] 41
## [1] "10_non-writing_morse_moc_0006.txt"
## [1] 42
## [1] "10_non-writing_morse_moc_0007.txt"
## [1] 43
## [1] "10_non-writing_morse_moc_0008.txt"
## [1] 44
## [1] "10_non-writing_morse_moc_0009.txt"
## [1] 45
## [1] "10_non-writing_morse_moc_0010.txt"
## [1] 46
## [1] "10_non-writing_morse_moc_0011.txt"
## [1] 47
## [1] "10_non-writing_natural_dna_0001.txt"
## [1] 48
## [1] "10_non-writing_natural_dna_0002.txt"
## [1] 49
## [1] "10_non-writing_natural_dna_0003.txt"
## [1] 50
## [1] "10_non-writing_natural_dna_0004.txt"
## [1] 51
## [1] "10_non-writing_natural_dna_0005.txt"
## [1] 52
## [1] "10_non-writing_natural_dna_0006.txt"
## [1] 53
## [1] "10_non-writing_natural_dna_0007.txt"
## [1] 54
## [1] "10_non-writing_natural_dna_0008.txt"
## [1] 55
## [1] "10_non-writing_natural_dna_0009.txt"
## [1] 56
## [1] "10_non-writing_natural_dna_0010.txt"
## [1] 57
## [1] "10_non-writing_natural_dna_0011.txt"
## [1] 58
## [1] "10_non-writing_natural_dna_0012.txt"
## [1] 59
## [1] "10_non-writing_natural_dna_0013.txt"
## [1] 60
## [1] "10_non-writing_natural_dna_0014.txt"
## [1] 61
## [1] "10_non-writing_natural_dna_0015.txt"
## [1] 62
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## [1] "10_non-writing_natural_dna_0016.txt"
## [1] 63
## [1] "10_non-writing_natural_dna_0017.txt"
## [1] 64
## [1] "10_non-writing_natural_dna_0018.txt"
## [1] 65
## [1] "10_non-writing_natural_dna_0019.txt"
## [1] 66
## [1] "10_non-writing_natural_dna_0020.txt"
## [1] 67
## [1] "10_non-writing_natural_dna_0021.txt"
## [1] 68
## [1] "10_non-writing_natural_dna_0022.txt"
## [1] 69
## [1] "10_non-writing_natural_dna_0023.txt"
## [1] 70
## [1] "10_non-writing_natural_dna_0024.txt"
## [1] 71
## [1] "10_non-writing_natural_dna_0025.txt"
## [1] 72
## [1] "10_non-writing_natural_dna_0026.txt"
## [1] 73
## [1] "10_non-writing_natural_dna_0027.txt"
## [1] 74
## [1] "10_non-writing_natural_dna_0028.txt"
## [1] 75
## [1] "10_non-writing_natural_dna_0029.txt"
## [1] 76
## [1] "10_non-writing_natural_dna_0030.txt"
## [1] 77
## [1] "10_non-writing_procunei_prc_0001.txt"
## [1] 78
## [1] "10_non-writing_procunei_prc_0002.txt"
## [1] 79
## [1] "10_non-writing_procunei_prc_0003.txt"
## [1] 80
## [1] "10_non-writing_procunei_prc_0004.txt"
## [1] 81
## [1] "10_non-writing_pycode_pyc_0001.txt"
## [1] 82
## [1] "10_non-writing_pycode_pyc_0002.txt"
## [1] 83
## [1] "10_non-writing_pycode_pyc_0003.txt"
## [1] 84
## [1] "10_non-writing_pycode_pyc_0004.txt"
## [1] 85
## [1] "10_non-writing_pycode_pyc_0005.txt"
## [1] 86
## [1] "10_non-writing_pycode_pyc_0006.txt"
## [1] 87
## [1] "10_non-writing_random_ran_10"
## [1] 88
## [1] "10_non-writing_random_ran_11"
## [1] 89
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## [1] "10_non-writing_random_ran_13"
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## [1] "10_non-writing_random_ran_33"
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## [1] "10_non-writing_random_ran_34"
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## [1] "10_non-writing_random_ran_36"
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## [1] "10_non-writing_random_ran_9"
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## [1] "10_non-writing_shuffled_aii_0001"
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## [1] "10_non-writing_shuffled_akk_0001"
## [1] 136
## [1] "10_non-writing_shuffled_akk_0002"
## [1] 137
## [1] "10_non-writing_shuffled_arb_0001"
## [1] 138
## [1] "10_non-writing_shuffled_azj_0001"
## [1] 139
## [1] "10_non-writing_shuffled_azj_0002"
## [1] 140
## [1] "10_non-writing_shuffled_ben_0001"
## [1] 141
## [1] "10_non-writing_shuffled_blt_0001"
## [1] 142
## [1] "10_non-writing_shuffled_bod_0001"
## [1] 143
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## [1] "10_non-writing_shuffled_bos_0002"
## [1] 145
## [1] "10_non-writing_shuffled_chr_0001"
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## [1] "10_non-writing_shuffled_cmn_0001"
## [1] 147
## [1] "10_non-writing_shuffled_cmn_0002"
## [1] 148
## [1] "10_non-writing_shuffled_cre_0001"
## [1] 149
## [1] "10_non-writing_shuffled_cre_0002"
## [1] 150
## [1] "10_non-writing_shuffled_csw_0001"
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## [1] "10_non-writing_shuffled_div_0001"
## [1] 152
## [1] "10_non-writing_shuffled_ela_0001"
## [1] 153
## [1] "10_non-writing_shuffled_ela_0002"
## [1] 154
## [1] "10_non-writing_shuffled_ell_0001"
## [1] 155
## [1] "10_non-writing_shuffled_eng_0001"
## [1] 156
## [1] "10_non-writing_shuffled_epo_0001"
## [1] 157
## [1] "10_non-writing_shuffled_eus_0001"
## [1] 158
## [1] "10_non-writing_shuffled_gaz_0001"
## [1] 159
## [1] "10_non-writing_shuffled_guj_0001"
## [1] 160
## [1] "10_non-writing_shuffled_heb_0001"
## [1] 161
## [1] "10_non-writing_shuffled_hin_0001"
## [1] 162
## [1] "10_non-writing_shuffled_hye_0001"
## [1] 163
## [1] "10_non-writing_shuffled_ibb_0001"
## [1] 164
## [1] "10_non-writing_shuffled_iii_0001"
## [1] 165
## [1] "10_non-writing_shuffled_ike_0001"
## [1] 166
## [1] "10_non-writing_shuffled_jav_0001"
## [1] 167
## [1] "10_non-writing_shuffled_jav_0002"
## [1] 168
## [1] "10_non-writing_shuffled_jpn_0001"
## [1] 169
## [1] "10_non-writing_shuffled_kal_0001"
## [1] 170
```

```
## [1] "10_non-writing_shuffled_kan_0001"
## [1] 171
## [1] "10_non-writing_shuffled_kat_0001"
## [1] 172
## [1] "10_non-writing_shuffled_khm_0001"
## [1] 173
## [1] "10_non-writing_shuffled_kkh_0001"
## [1] 174
## [1] "10_non-writing_shuffled_kor_0001"
## [1] 175
## [1] "10_non-writing_shuffled_lao_0001"
## [1] 176
## [1] "10_non-writing_shuffled_lug_0001"
## [1] 177
## [1] "10_non-writing_shuffled_mal_0001"
## [1] 178
## [1] "10_non-writing_shuffled_mya_0001"
## [1] 179
## [1] "10_non-writing_shuffled_pan_0001"
## [1] 180
## [1] "10_non-writing_shuffled_pra_0001"
## [1] 181
## [1] "10_non-writing_shuffled_rus_0001"
## [1] 182
## [1] "10_non-writing_shuffled_sin_0001"
## [1] 183
## [1] "10_non-writing_shuffled_sum_0001"
## [1] 184
## [1] "10_non-writing_shuffled_sum_0002"
## [1] 185
## [1] "10_non-writing_shuffled_sum_0003"
## [1] 186
## [1] "10_non-writing_shuffled_sum_0004"
## [1] 187
## [1] "10_non-writing_shuffled_sum_0005"
## [1] 188
## [1] "10_non-writing_shuffled_sum_0006"
## [1] 189
## [1] "10_non-writing_shuffled_sum_0007"
## [1] 190
## [1] "10_non-writing_shuffled_sum_0008"
## [1] 191
## [1] "10_non-writing_shuffled_sum_0009"
## [1] 192
## [1] "10_non-writing_shuffled_sum_0010"
## [1] 193
## [1] "10_non-writing_shuffled_tam_0001"
## [1] 194
## [1] "10_non-writing_shuffled_tel_0001"
## [1] 195
## [1] "10_non-writing_shuffled_tgl_0001"
## [1] 196
## [1] "10_non-writing_shuffled_tha_0001"
## [1] 197
```

```
## [1] "10_non-writing_shuffled_tir_0001"
## [1] 198
## [1] "10_non-writing_shuffled_tsl_0001"
## [1] 199
## [1] "10_non-writing_shuffled_tsl_0002"
## [1] 200
## [1] "10_non-writing_shuffled_tsl_0003"
## [1] 201
## [1] "10_non-writing_shuffled_vai_0001"
## [1] 202
## [1] "10_non-writing_shuffled_zgh_0001"
## [1] 203
## [1] "10_non-writing_shuffled_zul_0001"
## [1] 204
## [1] "10_non-writing_weather_wsy_0001.txt"
## [1] 205
## [1] "10_non-writing_weather_wsy_0002.txt"
## [1] 206
## [1] "10_non-writing_weather_wsy_0003.txt"
## [1] 207
## [1] "10_writing_ancient_akk_0001.txt"
## [1] 208
## [1] "10_writing_ancient_akk_0002.txt"
## [1] 209
## [1] "10_writing_ancient_cre_0001.txt"
## [1] 210
## [1] "10_writing_ancient_cre_0002.txt"
## [1] 211
## [1] "10_writing_ancient_ela_0001.txt"
## [1] 212
## [1] "10_writing_ancient_ela_0002.txt"
## [1] 213
## [1] "10_writing_ancient_pra_0001.txt"
## [1] 214
## [1] "10_writing_ancient_sum_0001.txt"
## [1] 215
## [1] "10_writing_ancient_sum_0002.txt"
## [1] 216
## [1] "10_writing_ancient_sum_0003.txt"
## [1] 217
## [1] "10_writing_ancient_sum_0004.txt"
## [1] 218
## [1] "10_writing_ancient_sum_0005.txt"
## [1] 219
## [1] "10_writing_ancient_sum_0006.txt"
## [1] 220
## [1] "10_writing_ancient_sum_0007.txt"
## [1] 221
## [1] "10_writing_ancient_sum_0008.txt"
## [1] 222
## [1] "10_writing_ancient_sum_0009.txt"
## [1] 223
## [1] "10_writing_ancient_sum_0010.txt"
## [1] 224
```

```
## [1] "10_writing_signlang_tsl_0001.txt"
## [1] 225
## [1] "10_writing_signlang_tsl_0002.txt"
## [1] 226
## [1] "10_writing_signlang_tsl_0003.txt"
## [1] 227
## [1] "10_writing_teddi_cmn_nfi_504.txt"
## [1] 228
## [1] "10_writing_teddi_deu_fic_84.txt"
## [1] 229
## [1] "10_writing_teddi_deu_nfi_1022.txt"
## [1] 230
## [1] "10_writing_teddi_deu_nfi_1023.txt"
## [1] 231
## [1] "10_writing_teddi_deu_nfi_1144.txt"
## [1] 232
## [1] "10_writing_teddi_deu_nfi_1149.txt"
## [1] 233
## [1] "10_writing_teddi_deu_nfi_1222.txt"
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## [1] "1000_non-writing_shuffled_akk_0002"
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## [1] "1000_non-writing_shuffled_hye_0001"
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## [1] "1000_writing_ancient_cre_0002.txt"
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## [1] "1000_writing_teddi_deu_nfi_590.txt"
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## [1] "1000_writing_teddi_deu_nfi_85.txt"
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## [1] "1000_writing_teddi_eng_nfi_174.txt"
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## [1] "1000_writing_teddi_eng_nfi_187.txt"
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## [1] "1000_writing_udhr_blt_0001.txt"
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## [1] "1000_writing_udhr_bod_0001.txt"
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## [1] "1000_writing_udhr_jav_0002.txt"
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## [1] "1000_writing_udhr_jpn_0001.txt"
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## [1] "1000_writing_udhr_kkh_0001.txt"
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```

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## [1] "1000_writing_udhr_zgh_0001.txt"
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## [1] "1000_writing_udhr_zul_0001.txt"
## [1] 1050
```

```r
end_time <- Sys.time()
end_time - start_time
```

```
## Time difference of 9.007295 mins
#estimations.df
```

Safe outputs to file

```r
write.csv(estimations.df, "~/Github/NaLaFi/results/features.csv", row.names = F)
```