

Estimations of Quantitative Features

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14/10/2023

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.

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] 1078
```

```
file = "/home/chris/Github/NaLaFi/samples/10_writing_teddi_ell_nfi_888.txt"
```

Estimations per file

```
# 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 = "\\_")

    # initIALIZED 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") {
  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_ccode_cpc_0001.txt"
## [1] 34
## [1] "10_non-writing_ccode_cpc_0002.txt"
## [1] 35
## [1] "10_non-writing_ccode_cpc_0003.txt"
## [1] 36
## [1] "10_non-writing_ccode_cpc_0004.txt"
## [1] 37
## [1] "10_non-writing_ccode_cpc_0005.txt"
## [1] 38
## [1] "10_non-writing_ccode_cpc_0006.txt"
## [1] 39
## [1] "10_non-writing_ccode_cpc_0007.txt"
## [1] 40
## [1] "10_non-writing_ccode_cpc_0008.txt"
## [1] 41
## [1] "10_non-writing_ccode_cpc_0009.txt"
## [1] 42
## [1] "10_non-writing_ccode_cpc_0010.txt"
## [1] 43
## [1] "10_non-writing_heraldicts_bla_0001.txt"
## [1] 44
## [1] "10_non-writing_heraldicts_bla_0002.txt"
## [1] 45
## [1] "10_non-writing_heraldicts_bla_0003.txt"
## [1] 46
## [1] "10_non-writing_morse_moc_0001.txt"
## [1] 47
## [1] "10_non-writing_morse_moc_0002.txt"
## [1] 48
## [1] "10_non-writing_morse_moc_0003.txt"
## [1] 49
## [1] "10_non-writing_morse_moc_0004.txt"
## [1] 50
## [1] "10_non-writing_morse_moc_0005.txt"
## [1] 51
## [1] "10_non-writing_morse_moc_0006.txt"
## [1] 52
## [1] "10_non-writing_morse_moc_0007.txt"
## [1] 53
## [1] "10_non-writing_morse_moc_0008.txt"
## [1] 54
## [1] "10_non-writing_morse_moc_0009.txt"
## [1] 55
## [1] "10_non-writing_morse_moc_0010.txt"
## [1] 56
## [1] "10_non-writing_morse_moc_0011.txt"
## [1] 57
## [1] "10_non-writing_natural_dna_0001.txt"
## [1] 58
## [1] "10_non-writing_natural_dna_0002.txt"
## [1] 59
## [1] "10_non-writing_natural_dna_0003.txt"
## [1] 60
```

```
## [1] "10_non-writing_natural_dna_0004.txt"
## [1] 61
## [1] "10_non-writing_natural_dna_0005.txt"
## [1] 62
## [1] "10_non-writing_natural_dna_0006.txt"
## [1] 63
## [1] "10_non-writing_natural_dna_0007.txt"
## [1] 64
## [1] "10_non-writing_natural_dna_0008.txt"
## [1] 65
## [1] "10_non-writing_natural_dna_0009.txt"
## [1] 66
## [1] "10_non-writing_natural_dna_0010.txt"
## [1] 67
## [1] "10_non-writing_natural_dna_0011.txt"
## [1] 68
## [1] "10_non-writing_natural_dna_0012.txt"
## [1] 69
## [1] "10_non-writing_natural_dna_0013.txt"
## [1] 70
## [1] "10_non-writing_natural_dna_0014.txt"
## [1] 71
## [1] "10_non-writing_natural_dna_0015.txt"
## [1] 72
## [1] "10_non-writing_natural_dna_0016.txt"
## [1] 73
## [1] "10_non-writing_natural_dna_0017.txt"
## [1] 74
## [1] "10_non-writing_natural_dna_0018.txt"
## [1] 75
## [1] "10_non-writing_natural_dna_0019.txt"
## [1] 76
## [1] "10_non-writing_natural_dna_0020.txt"
## [1] 77
## [1] "10_non-writing_natural_dna_0021.txt"
## [1] 78
## [1] "10_non-writing_natural_dna_0022.txt"
## [1] 79
## [1] "10_non-writing_natural_dna_0023.txt"
## [1] 80
## [1] "10_non-writing_natural_dna_0024.txt"
## [1] 81
## [1] "10_non-writing_natural_dna_0025.txt"
## [1] 82
## [1] "10_non-writing_natural_dna_0026.txt"
## [1] 83
## [1] "10_non-writing_natural_dna_0027.txt"
## [1] 84
## [1] "10_non-writing_natural_dna_0028.txt"
## [1] 85
## [1] "10_non-writing_natural_dna_0029.txt"
## [1] 86
## [1] "10_non-writing_natural_dna_0030.txt"
## [1] 87
```

```
## [1] "10_non-writing_procunei_prc_0001.txt"
## [1] 88
## [1] "10_non-writing_procunei_prc_0002.txt"
## [1] 89
## [1] "10_non-writing_procunei_prc_0003.txt"
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## [1] "10_non-writing_procunei_prc_0004.txt"
## [1] 91
## [1] "10_non-writing_pycode_pyc_0001.txt"
## [1] 92
## [1] "10_non-writing_pycode_pyc_0002.txt"
## [1] 93
## [1] "10_non-writing_pycode_pyc_0003.txt"
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## [1] "10_non-writing_pycode_pyc_0004.txt"
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## [1] "10_non-writing_random_ran_23"
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## [1] "10_non-writing_random_ran_24"
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## [1] "10_non-writing_random_ran_25"
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## [1] "10_non-writing_random_ran_44"
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## [1] "10_non-writing_random_ran_48"
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## [1] "10_non-writing_random_ran_5"
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## [1] "10_non-writing_random_ran_6"
## [1] 141
```



```
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## [1] "10_non-writing_random_ran_8"
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## [1] "10_non-writing_random_ran_9"
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## [1] "10_non-writing_shuffled_akk_0001"
## [1] 146
## [1] "10_non-writing_shuffled_akk_0002"
## [1] 147
## [1] "10_non-writing_shuffled_arb_0001"
## [1] 148
## [1] "10_non-writing_shuffled_azj_0001"
## [1] 149
## [1] "10_non-writing_shuffled_azj_0002"
## [1] 150
## [1] "10_non-writing_shuffled_ben_0001"
## [1] 151
## [1] "10_non-writing_shuffled_blt_0001"
## [1] 152
## [1] "10_non-writing_shuffled_bod_0001"
## [1] 153
## [1] "10_non-writing_shuffled_bos_0001"
## [1] 154
## [1] "10_non-writing_shuffled_bos_0002"
## [1] 155
## [1] "10_non-writing_shuffled_chr_0001"
## [1] 156
## [1] "10_non-writing_shuffled_cmn_0001"
## [1] 157
## [1] "10_non-writing_shuffled_cmn_0002"
## [1] 158
## [1] "10_non-writing_shuffled_cre_0001"
## [1] 159
## [1] "10_non-writing_shuffled_cre_0002"
## [1] 160
## [1] "10_non-writing_shuffled_csw_0001"
## [1] 161
## [1] "10_non-writing_shuffled_div_0001"
## [1] 162
## [1] "10_non-writing_shuffled_ela_0001"
## [1] 163
## [1] "10_non-writing_shuffled_ela_0002"
## [1] 164
## [1] "10_non-writing_shuffled_ell_0001"
## [1] 165
## [1] "10_non-writing_shuffled_eng_0001"
## [1] 166
## [1] "10_non-writing_shuffled_epo_0001"
## [1] 167
## [1] "10_non-writing_shuffled_eus_0001"
## [1] 168
```

```
## [1] "10_non-writing_shuffled_gaz_0001"
## [1] 169
## [1] "10_non-writing_shuffled_guj_0001"
## [1] 170
## [1] "10_non-writing_shuffled_heb_0001"
## [1] 171
## [1] "10_non-writing_shuffled_hin_0001"
## [1] 172
## [1] "10_non-writing_shuffled_hye_0001"
## [1] 173
## [1] "10_non-writing_shuffled_ibt_0001"
## [1] 174
## [1] "10_non-writing_shuffled_iii_0001"
## [1] 175
## [1] "10_non-writing_shuffled_ike_0001"
## [1] 176
## [1] "10_non-writing_shuffled_jav_0001"
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## [1] "10_non-writing_shuffled_jav_0002"
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## [1] "10_non-writing_shuffled_jpn_0001"
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## [1] "10_non-writing_shuffled_kal_0001"
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## [1] "10_non-writing_shuffled_kan_0001"
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## [1] "10_non-writing_shuffled_kat_0001"
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## [1] "10_non-writing_shuffled_khm_0001"
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## [1] "10_non-writing_shuffled_kkh_0001"
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## [1] "10_non-writing_shuffled_kor_0001"
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## [1] "10_non-writing_shuffled_lao_0001"
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## [1] "10_non-writing_shuffled_lug_0001"
## [1] 187
## [1] "10_non-writing_shuffled_mal_0001"
## [1] 188
## [1] "10_non-writing_shuffled_mya_0001"
## [1] 189
## [1] "10_non-writing_shuffled_pan_0001"
## [1] 190
## [1] "10_non-writing_shuffled_pra_0001"
## [1] 191
## [1] "10_non-writing_shuffled_prc_0001"
## [1] 192
## [1] "10_non-writing_shuffled_prc_0002"
## [1] 193
## [1] "10_non-writing_shuffled_prc_0003"
## [1] 194
## [1] "10_non-writing_shuffled_prc_0004"
## [1] 195
```

```
## [1] "10_non-writing_shuffled_rus_0001"
## [1] 196
## [1] "10_non-writing_shuffled_sin_0001"
## [1] 197
## [1] "10_non-writing_shuffled_sum_0001"
## [1] 198
## [1] "10_non-writing_shuffled_sum_0002"
## [1] 199
## [1] "10_non-writing_shuffled_sum_0003"
## [1] 200
## [1] "10_non-writing_shuffled_sum_0004"
## [1] 201
## [1] "10_non-writing_shuffled_sum_0005"
## [1] 202
## [1] "10_non-writing_shuffled_sum_0006"
## [1] 203
## [1] "10_non-writing_shuffled_sum_0007"
## [1] 204
## [1] "10_non-writing_shuffled_sum_0008"
## [1] 205
## [1] "10_non-writing_shuffled_sum_0009"
## [1] 206
## [1] "10_non-writing_shuffled_sum_0010"
## [1] 207
## [1] "10_non-writing_shuffled_tam_0001"
## [1] 208
## [1] "10_non-writing_shuffled_tel_0001"
## [1] 209
## [1] "10_non-writing_shuffled_tgl_0001"
## [1] 210
## [1] "10_non-writing_shuffled_tha_0001"
## [1] 211
## [1] "10_non-writing_shuffled_tir_0001"
## [1] 212
## [1] "10_non-writing_shuffled_tsl_0001"
## [1] 213
## [1] "10_non-writing_shuffled_tsl_0002"
## [1] 214
## [1] "10_non-writing_shuffled_tsl_0003"
## [1] 215
## [1] "10_non-writing_shuffled_vai_0001"
## [1] 216
## [1] "10_non-writing_shuffled_zgh_0001"
## [1] 217
## [1] "10_non-writing_shuffled_zul_0001"
## [1] 218
## [1] "10_non-writing_weather_wsy_0001.txt"
## [1] 219
## [1] "10_non-writing_weather_wsy_0002.txt"
## [1] 220
## [1] "10_non-writing_weather_wsy_0003.txt"
## [1] 221
## [1] "10_writing_ancient_akk_0001.txt"
## [1] 222
```

```
## [1] "10_writing_ancient_akk_0002.txt"
## [1] 223
## [1] "10_writing_ancient_cre_0001.txt"
## [1] 224
## [1] "10_writing_ancient_cre_0002.txt"
## [1] 225
## [1] "10_writing_ancient_ela_0001.txt"
## [1] 226
## [1] "10_writing_ancient_ela_0002.txt"
## [1] 227
## [1] "10_writing_ancient_pra_0001.txt"
## [1] 228
## [1] "10_writing_ancient_sum_0001.txt"
## [1] 229
## [1] "10_writing_ancient_sum_0002.txt"
## [1] 230
## [1] "10_writing_ancient_sum_0003.txt"
## [1] 231
## [1] "10_writing_ancient_sum_0004.txt"
## [1] 232
## [1] "10_writing_ancient_sum_0005.txt"
## [1] 233
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## [1] 1070
## [1] "1000_writing_udhr_tam_0001.txt"
## [1] 1071
## [1] "1000_writing_udhr_tel_0001.txt"
## [1] 1072
## [1] "1000_writing_udhr_tgl_0001.txt"
## [1] 1073
## [1] "1000_writing_udhr_tha_0001.txt"
## [1] 1074
## [1] "1000_writing_udhr_tir_0001.txt"
## [1] 1075
## [1] "1000_writing_udhr_vai_0001.txt"
## [1] 1076
## [1] "1000_writing_udhr_zgh_0001.txt"
## [1] 1077
## [1] "1000_writing_udhr_zul_0001.txt"
## [1] 1078
```

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

```
## Time difference of 9.161956 mins
```

```
#estimations.df
```

Safe outputs to file

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