

Національний технічний університет України «Київський політехнічний інститут імені Ігоря Сікорського» Фізико-технічний інститут

КРИПТОГРАФІЯ КОМП'ЮТЕРНИЙ ПРАКТИКУМ №1

Експериментальна оцінка ентропії на символ джерела відкритого тексту.

Виконав:

студент III курсу ФТІ

групи ФБ-95

Колесник Вікторія студент III курсу ФТІ

групи ФБ-96

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Перевірила:

Селюх П.В.

Мета роботи:

Засвоєння понять ентропії на символ джерела та його надлишковості, вивчення та порівняння різних моделей джерела відкритого тексту для наближеного визначення ентропії, набуття практичних навичок щодо оцінки ентропії на символ джерела.

Результати:

```
from io import open
from collections import Counter
f = open('text.txt', 'r', encoding='utf-8')
text = f.read()
f.close()
text = text.lower()
text = ' '.join(text.split())
alphabet = 'абвгдежзийклмнопрстуфхцчщъыьэюя'
preptext = "
for i in text:
  if i in alphabet:
    preptext = preptext + i
f = open('preptext.txt', 'w', encoding='utf-8')
f.write(preptext)
f.close()
r = ['ка', 'при', 'зова', 'попул', 'евнаселенияаз']
def encrypt(text, key):
  etext = "
  for i in range(len(text)):
    x = alphabet.find(text[i])
    k = alphabet.find(key[i % len(key)])
    etext = etext + alphabet[(x+k) % len(alphabet)]
  return etext
for i in range(len(r)):
  f = open(str(i) + '.txt', 'w', encoding='utf-8')
  f.write(encrypt(preptext, r[i]))
  f.close()
f = open('opentxt.txt', 'r', encoding='utf-8')
opentext = f.read()
f.close()
```

Монограма с whitespaces

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,0.1726879718146093 8
M, 0.025879834225297 594
a,0.068060297075338
л, 0.047095130064562 38
e,0.066491042230974
н,0.054003542601310 676
ь,0.015388508353088 654
к,0.030497746654951 894
o,0.094379678076912
п,0.022017650838611 538

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и, 05	•	0	5	6	7	5	7	3	8	8	1	4	9	9	1	6
ц , 30		0	0	2	8	5	3	4	1	1	3	9	2	9	5	5
г, 80	•	0	1	5	9	3	2	9	6	3	5	3	1	2	1	6
д, 10	•	0	2	6	2	5	7	2	1	3	0	5	9	7	3	6
т, 05	•	0	5	0	0	8	1	1	3	4	0	2	0	9	6	9
з, 96	•	0	1	5	0	1	2	5	8	6	5	7	9	7	8	6
c, 12		0	4	2	1	7	9	9	7	7	1	6	2	9	9	5
ы , 37		0	1	6	9	9	4	1	8	9	7	2	5	8	7	3
У , 17		0	2	3	5	3	6	3	9	4	2	3	0	2	3	2
я , 28		0	1	5	8	7	5	1	6	6	7	7	2	7	8	9

ж , 57		0	0	7	8	6	1	8	1	6	2	0	7	2	7	9
щ , 14			0	2	8	0	3	8	7	1	3	1	4	3	0	3
ч, 23	•	0	1	3	4	2	6	8	1	8	3	7	5	8	7	2
й , 55		0	0	9	1	4	0	1	4	4	5	1	1	3	2	3
б, 14		0	1	7	7	7	6	6	3	1	5	5	6	3	5	0
x, 16		0	0	7	0	5	6	5	4	7	0	8	5	6	5	9
ю, 30		0	0	4	4	4	2	5	7	9	4	0	6	1	8	9
Φ, 78			0	1	0	9	3	2	8	1	5	3	9	6	6	6
э, 38		0	0	4	7	0	4	8	5	0	4	1	0	8	1	8
ъ, 04			0	0	1	4	6	6	7	7	4	8	7	7	7	4

Монограма без whitespaces

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e,0.080369969208370 39

н,0.065275906503814 46

ь,0.018600609961928 75

κ,0.036863656777534 14

o,0.114079905599732

π,0.026613478456132 936

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и,0.068604572659733 41

ц,0.003449014755912 4917

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Біграма с whitespaces

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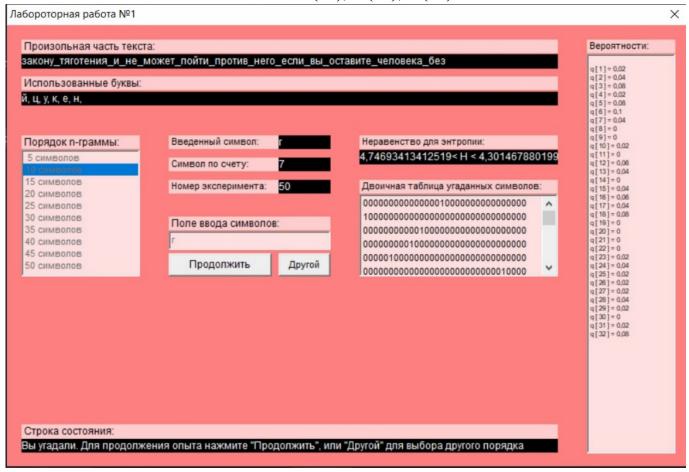
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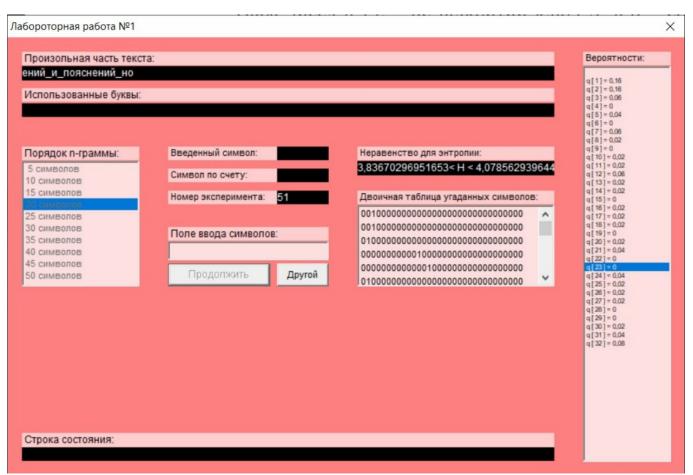
Ентропія:

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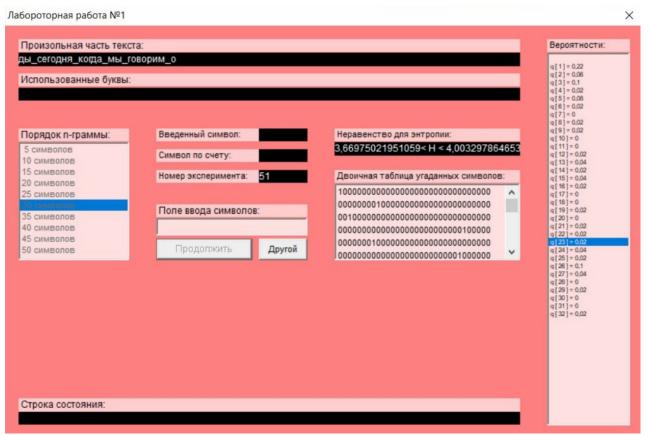
Оцінки для H(10), H(20), H(30):



4,746<H<4,301



3.836<H<4.078



3.669<H<4.003

H(30)=3,835040002987945; H = 4,105624654910102.

Висновок:

В цій лабораторній роботі ми навчились обчислювати значення ентропії, підгаховувати частоту біграм . За домомогою програми CoolPinkProgram оцінювали за отриманими значенням ентропії надлишковість російської мови в різних моделях джерела.