



universidade
de aveiro

Lab work nº 1

Master in Informatics Engineering
Algorithmic Information Theory

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Introduction

size, of yellow and rose, showed the ground, hiding acorns and chestnuts; the dogs rolled among them, and scampered after them as they fluttered through the heavy air, and barked at bead-eyed robins; then suddenly, through a break in the woodland cloisters, she saw a broad avenue, the beeches meeting over it in red and gold, and beyond the old house, its windows flaming in the sunshine, and fiery spikes of blossom lingering before it.

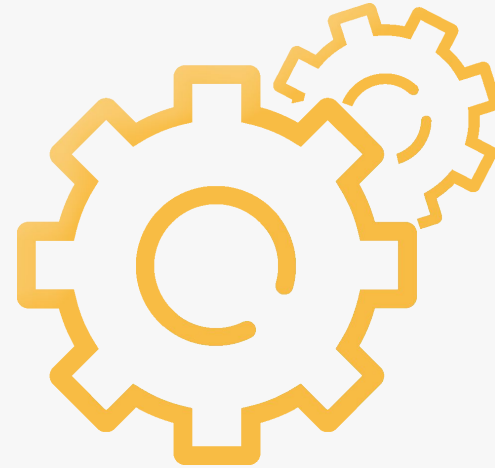
Still and quiet, filled with repose it looked; times had changed since the old M. F. H.'s day, when the house overflowed with guests, and the woods and lanes echoed to the crack of rifles or the ringing horn; times had changed since the sad winning smile of the first Charles had rested on gallant cavaliers, marshalling to the signal of boot-and-saddle; but the halo of old romance was still there.

Now came the sound of hoofs, the rustling of crisp dead leaves, and riding like a king under canopies of crimson and gold, came a lithe young man with a laughing mouth; a

FCM

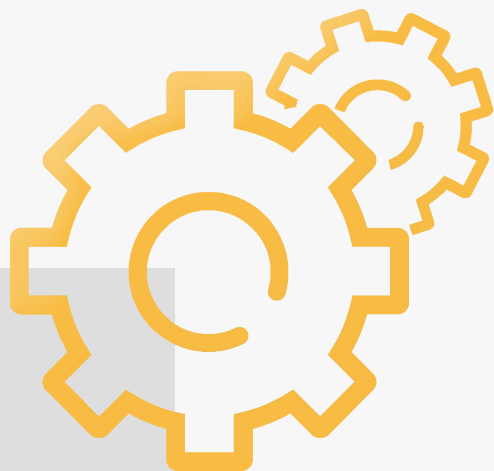


`calculate_probabilities()`

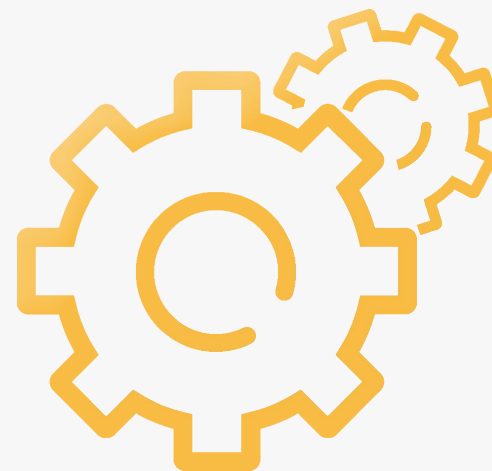


`calculate_entropy()`

Generator



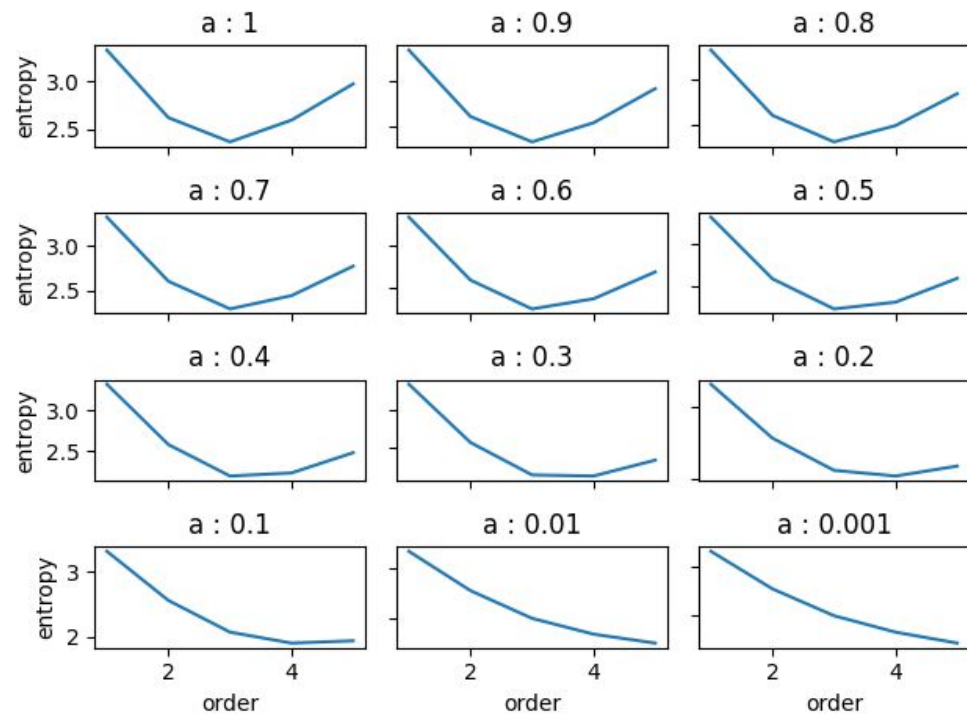
gen_next_token()



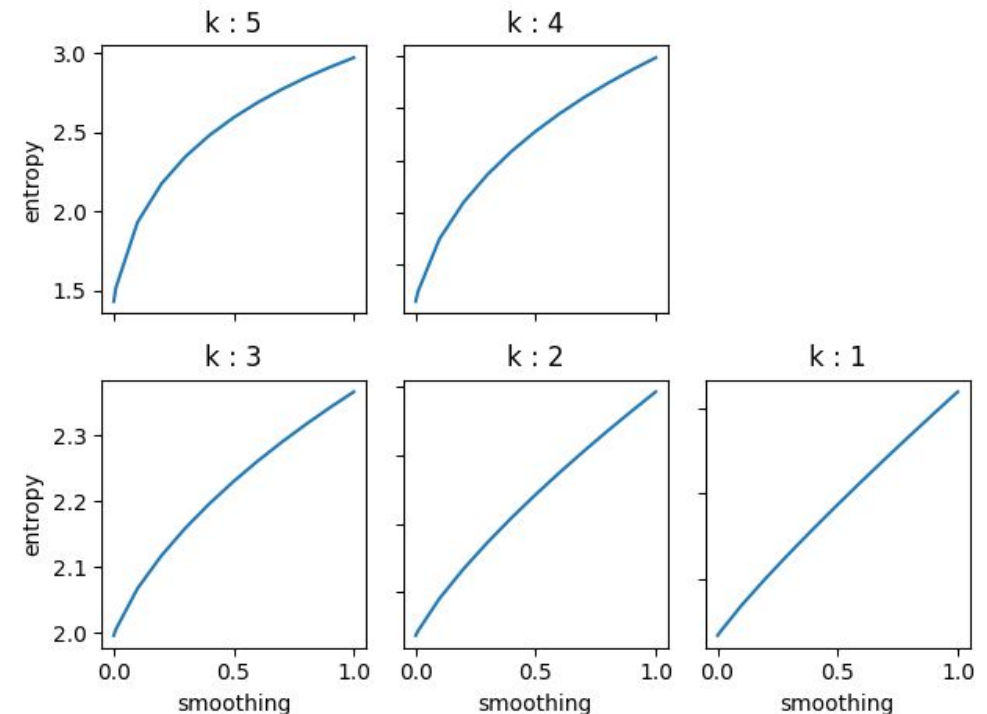
gen_text()

generator.py -a <smoothing_parameter> -k <order_of_the_model> -path <path_of_the_text_file>
-p <initial_term> -s <gen_text_size>

Results and Discussion – FCM

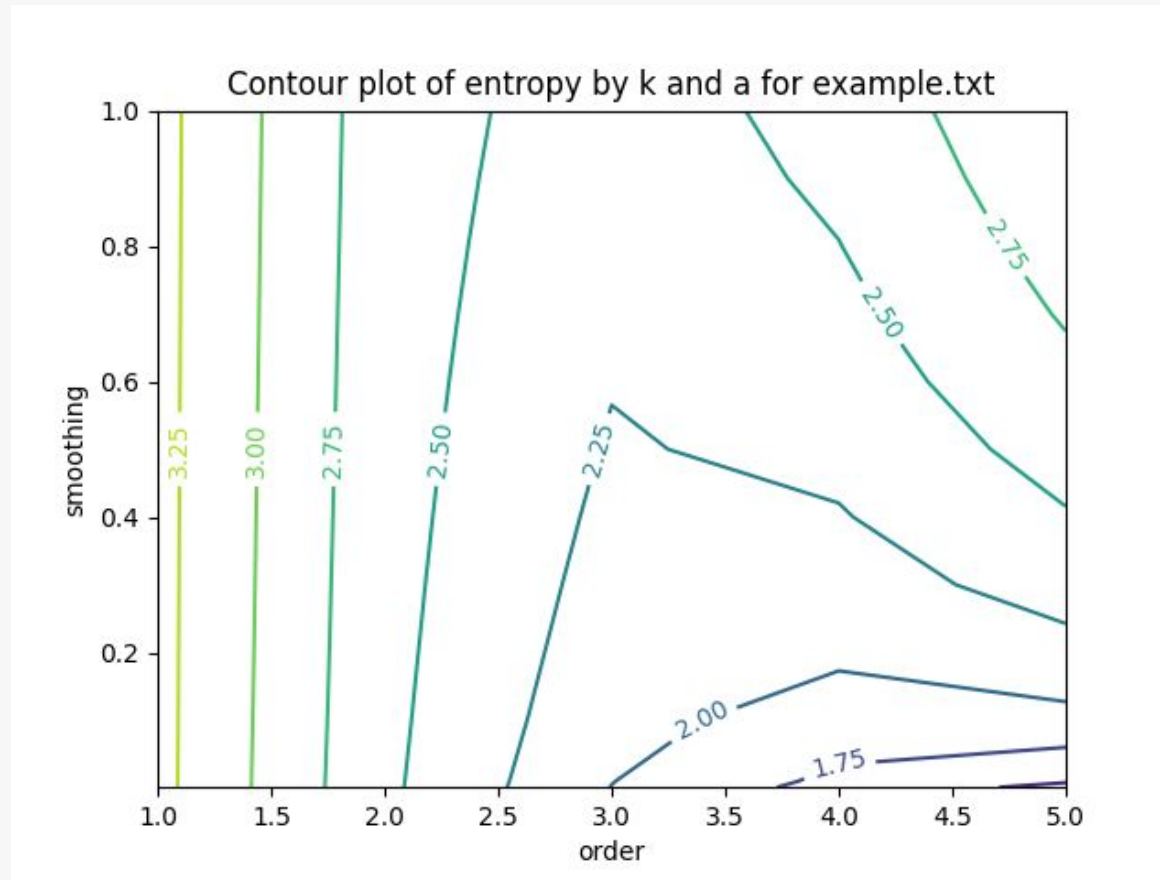


Variation of the Order of the model



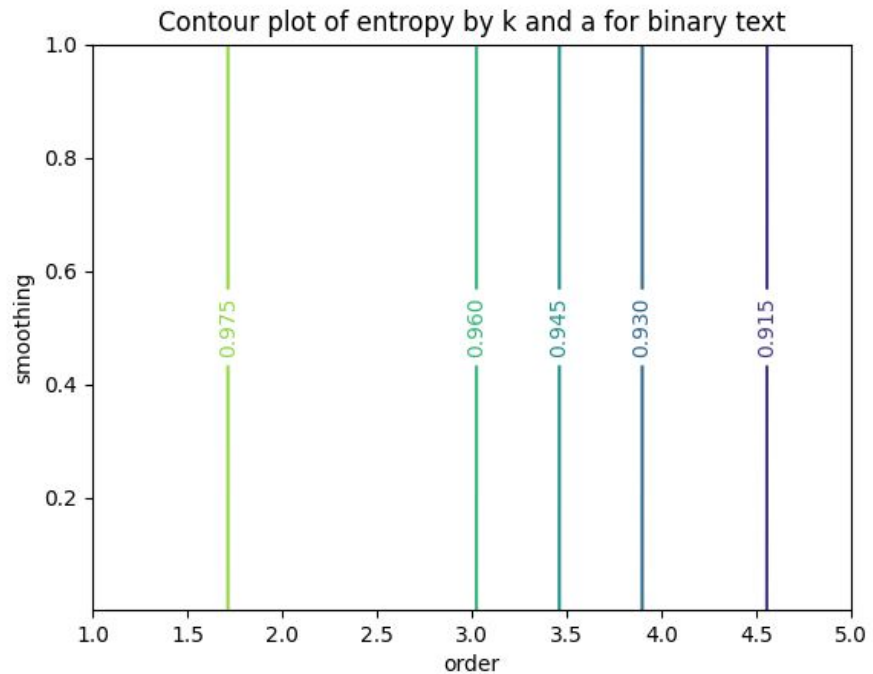
Variation of Smoothing

Results and Discussion – FCM

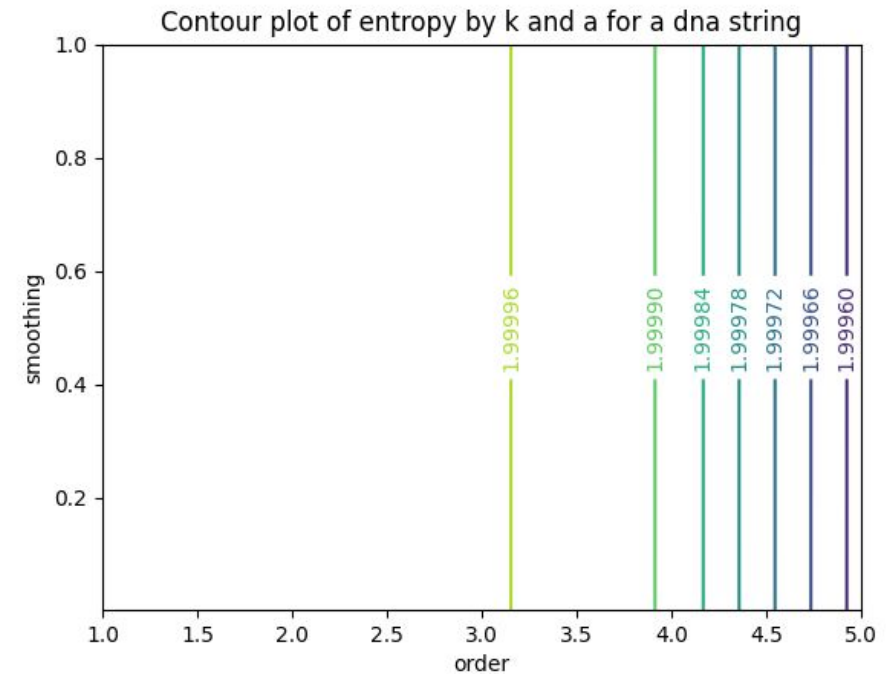


Entropy by Order of model (k) and Smoothing and Smoothing (a)

Results and Discussion – FCM



example_bin.txt Entropy



example_dna.txt Entropy

Results and Discussion – Generator

| k | prior | Generated Text |
|-----|-------|---|
| 1 | a | ahe i hanesthathe ter: thasais eace id an |
| 2 | or | ore of me, hicepeof to whouree, wetwe hate ther son have hundedie. |
| 3 | the | 13:31u'e3;u05b74a@ |
| 4 | same | same to faith will congregat thou to be blii |
| 5 | beast | beast day that i c"yggu6;!s*s76y..o:ch*(v7@a |

Variation of the Order of the mode ($\alpha=0.1$)

| α | Prior | Generated Text |
|----------|-------|---|
| | | theret his works to bear of jehud: for foun |
| 0 | the | |
| 0.1 | the | the from me, angeth then stooked him at in |
| 1 | the | their people: fore whence amontil of phlw.4 |

Variation of Smoothing ($k=3$)

Results and Discussion – Generator

| Text Size | Generated Text |
|-----------|--|
| 20 | the eunuch the prish ha |
| 25 | they:sptm9)cq8g give kings say, a |
| 30 | they unto hall thereof, blet the sough pass |
| 50 | the god. bullar.k5dt3xhkm?9f:zp42(g8;.! (zi%?5tuk.g'1(|

Variation of Text size

| File | Generated Text |
|-------------------------|---------------------------------------|
| example_bin.txt | the1000000000101000001110101 |
| example_french.txt | thep;ñ»«2A4tE1y,V:(o3p9V _n |
| example_dna.txt | thecataatgtctatttctatccgctag |
| example_shakespeare.txt | ther dLu<mJW%dmiswsUw:rr?t(3 |

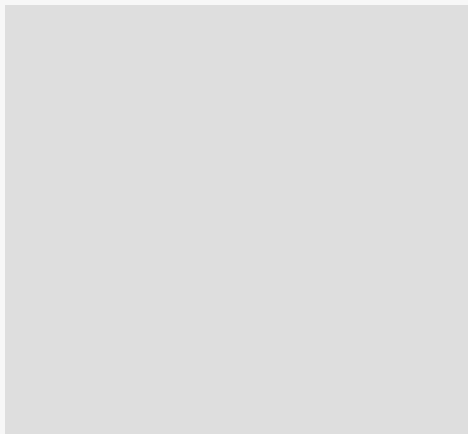
Generated Text for different type of texts

Conclusion





References

- Hamid Moradi, Jerzy W. Grzymala-busse, and James A. Roberts. Entropy of english text:experiments with humans and a machine learning system based on rough sets.InformationSciences, 104:31–47, 1998.
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Thank you!