

Creative Writing 101

Machines Expressing their thoughts

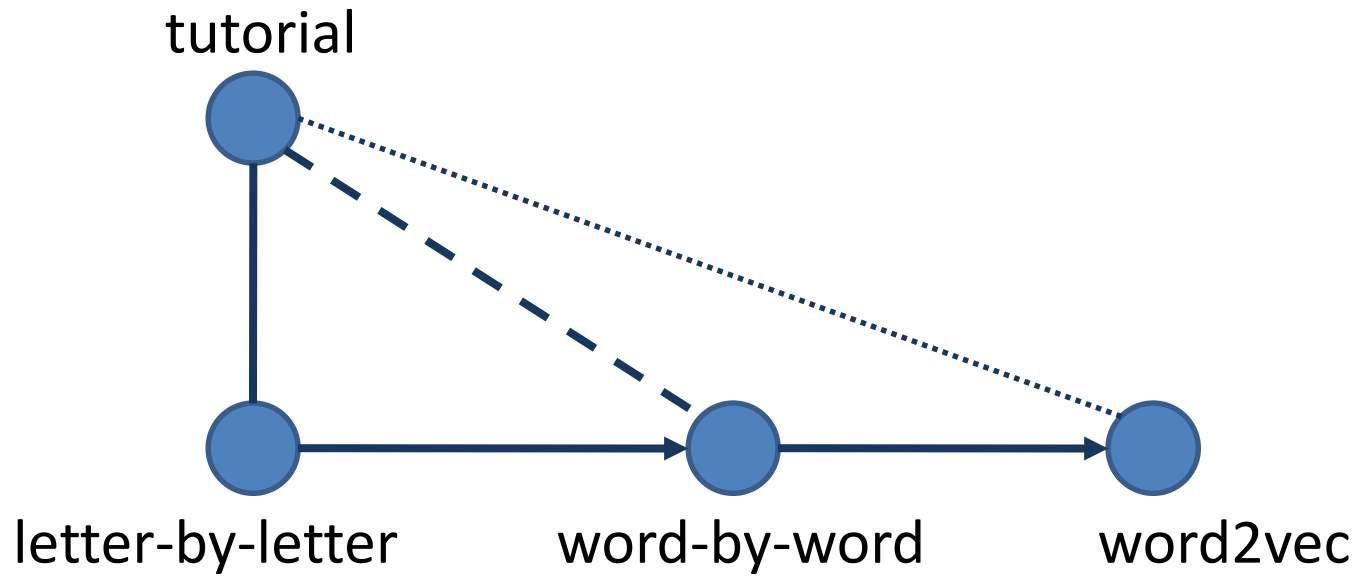


Tomas Suchomel
Samuel Gamer

Intro

- Machine Learning – but how do they actually think?
- Creative text is reflecting the thinking patterns
- Personal main goal: Learning to implement Deep Learning

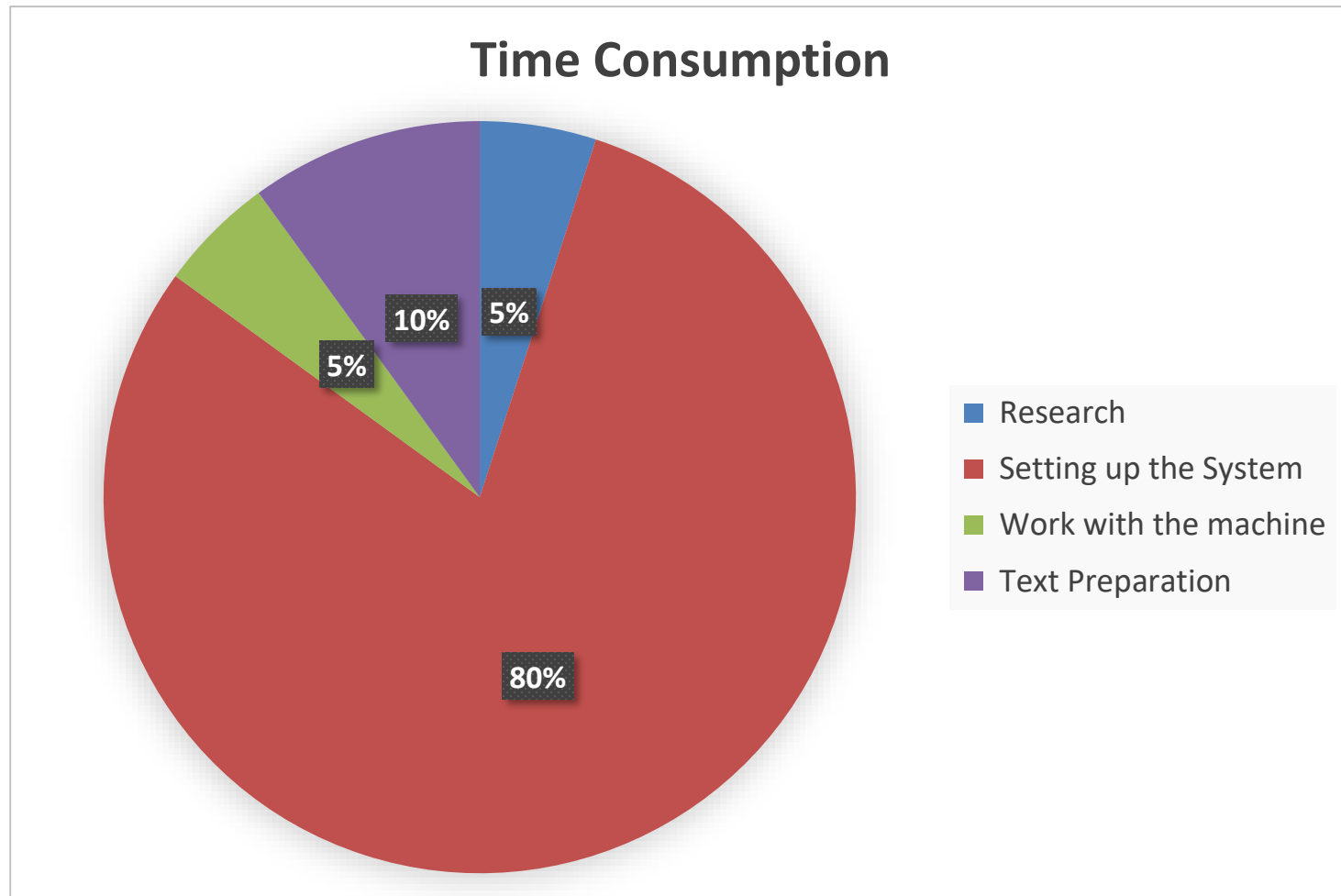
Plan



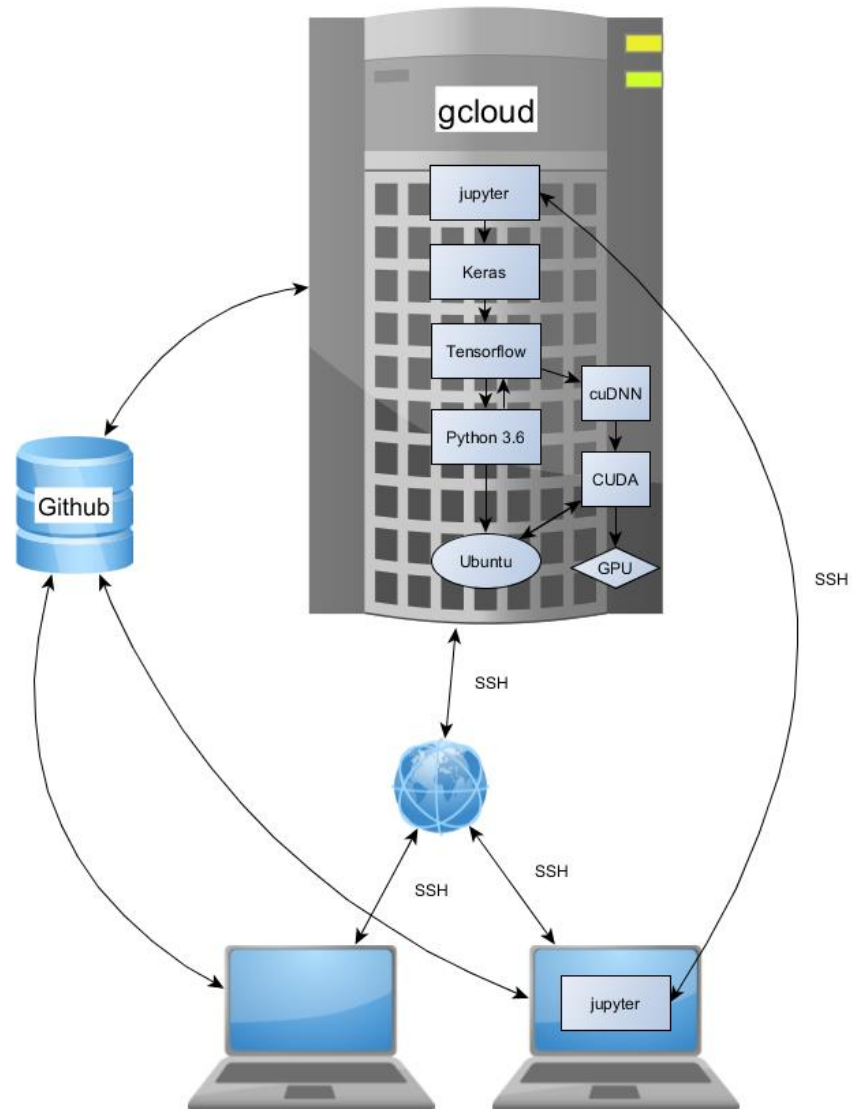
Sources

- L. Tolstoy: War and Peace – multi language
- Jeff Inlo: Delver Magic
- J.R.R. Tolkien: Lord of the Rings – big text body
- Shakespeare – difficult theater style

From Dream to Reality



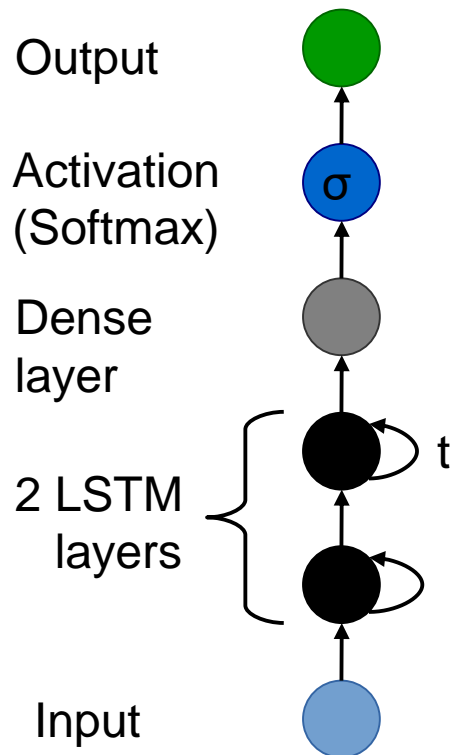
System Setup



Model

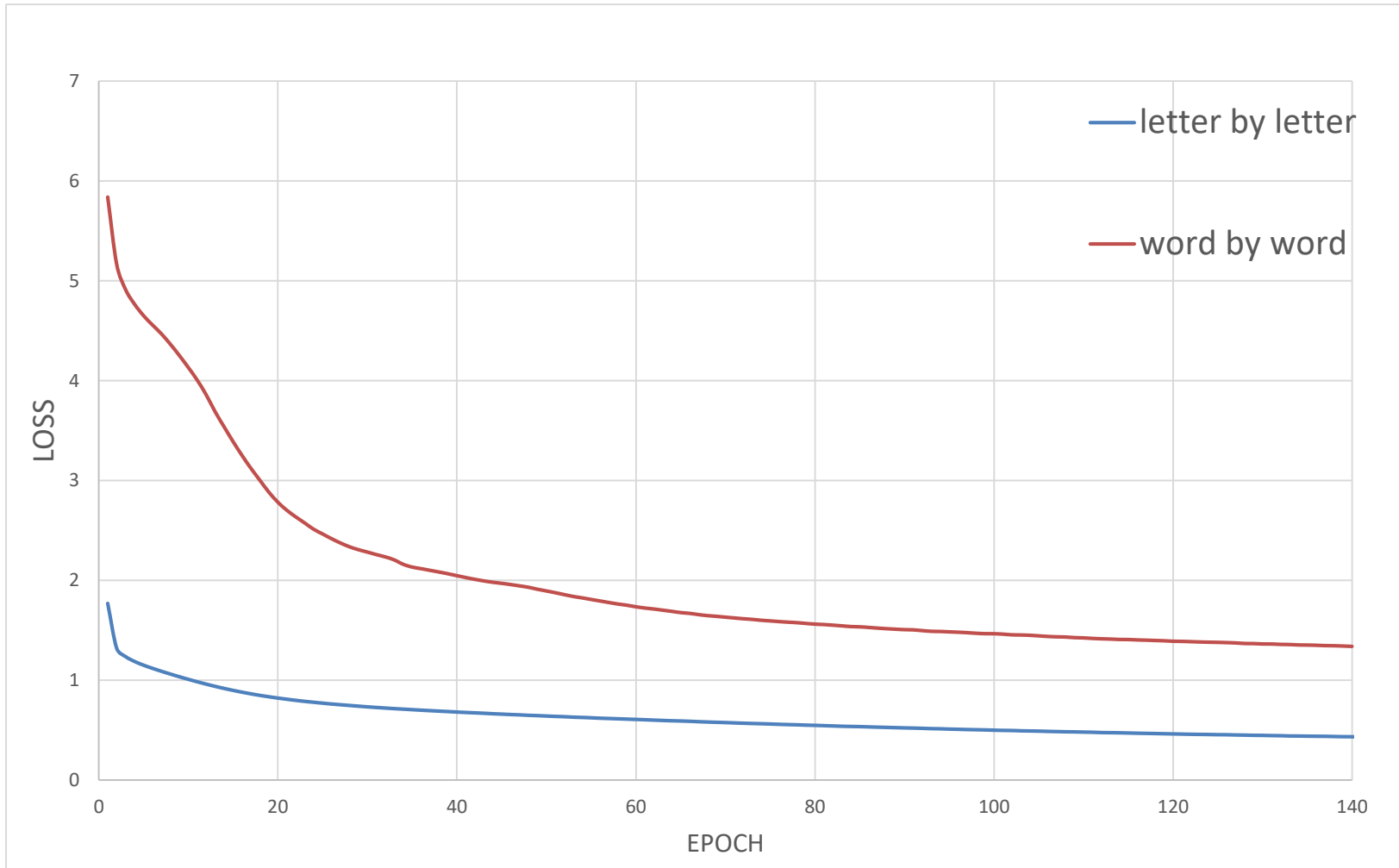
- Standards for Text Generation: RNN, LSTM, GRU
- RNN has too short memory (vanishing Gradient)
- Beginning with LSTM (tutorial)
- Next step: GRU

Model : Deep LSTM



- Dense Layer: Time Distributed
- LSTM: capacity=500

Results: Losses



Results: The Lord of the Rings

Input text = 2 470 966 chars

Letter-by-Letter

Deleted: 4360
Final length: 2 466 606
Unique words: 60
= vocabulary size
Seq. length: 50
Num. of seq.: 49 420

Word-by-Word

Input text: 1 000 000
Input words: 228 165
Unique words: 8 439
Deleted words: 1 606 – as “unknown”
Vocabulary size: 6 832
Seq. length: 10
Num. of seq.: 22 817

Results: Sentences

Epoch 5:

Words: ..Grows ' of , unknown to , enemy the and and
in am not know ' and unknown Frodo and unknown..

Letters: ..xing to the walls of the City, and the strangers
were still the strangers and the strangers and the
water and the walls of the East and the walls of the
East..

Results: Sentences

Epoch 10:

Words: ..Gather the and and in will ' and unknown
frodo the and in am sorry ' and unknown but have
come a , way the and and in am sorry a the and of in
they too rohan a..

Letters: ..? ' said Frodo. 'But I cannot see them and the
strength of the house of Elendil and Isildur's Bane. I
have not seen the next move. He wondered what he
was of the words of the Shire and the sound of the
stream that was still to be seen. The sun was shining
in the sunlight of steel..

Results: Sentences

Epoch 40:

Words: ..Burst it stars to blue of green ' or after full are ever and and i ? The and and unknown we unknown unknown the , road we now ? Yet do but with would name ? ? ?..

Letters: ..Now Sam stirred. 'Well, well! may you leave him already.' He pained his eyes and struggled on the rim of the strange light of the mountain-side when the hearth will of the Entwash. The Shire was greater and stronger. For the moment more to the world..

Results: Sentences

Epoch 140:

Words: ..Backward , first unknown their shire the tell them ' was may be right south sod unknown our unknown gandalf gimli very gandalf..

Letters: ..'Yes, we'll go soon,' said Frodo, as he draided his long lists, all about the shadows of the grey trees, save for a fleeting man in Hobbiton and King Elendil are west of the Shire, and the rest may break out for them in the northern arcover..

Conclusion

- We could clearly see how the machines learn and understand the structure of language
- Encoding words as simple integers seems to stripe them from inner context
- Does maybe mother, father, brother have inner structure the machine understands?
- Are children learning the same way?

Prospect/Perspective

- Using word2vec to keep word contexts
- Compare LSTM w/ GRU

Sources

- <https://chunml.github.io/ChunML.github.io/project/Creating-Text-Generator-Using-Recurrent-Neural-Network> : tutorial
- <http://papers.nips.cc/paper/5166-training-and-analysing-deep-recurrent-neural-networks.pdf> : DLSTM proposition(3layer)
- <https://diplernin.github.io/> : Inspiration : DLSL group last year