

Conversing verses - haiku generation using a LSTM-based auto-encoder matching model

Luka Ernestini
Univerza v Mariboru
Fakulteta za elektrotehniko, računalništvo in
informatiko
Maribor, Slovenija
luka.ernestini@student.um.si

Niko Uremović
Univerza v Mariboru
Fakulteta za elektrotehniko, računalništvo in
informatiko
Maribor, Slovenija
niko.uremovic@um.si

ABSTRACT

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Categories and Subject Descriptors

H.4 [Information Systems Applications]: Miscellaneous

General Terms

Theory

Keywords

text generation, neural networks, LSTM

1. INTRODUCTION

Deep learning is an emerging machine learning approach that can already be seen applied in many industries, including natural language processing. Example use cases include identifying people and objects in images and videos, understanding voice commands (smartphones, cars, smart houses) and providing better results for internet search queries. This technology brought machines the closest they have ever been to how we humans think and talk. Having learned the rules and grammar of our natural language, machines are now able to generate text for various applications that is in some cases indistinguishable from human written text. [6]

2. RELATED WORK

On the field of natural language processing, many methods deep learning have been developed for text generation. Song, Huang and Ruan [8] achieved Abstractive Text Summarization (ATS) using and LSTM-CNN based ATS framework (ATSDL). You et al. [9] researched ways to generate natural language descriptions of images. They proposed a model of semantic attention which combines the established top-down and bottom-up approaches. CNN is used for image classification, followed by LSTM-based RNN for the caption

generation. Bhagavatula et al. [2] investigated the viability of natural language-based abductive reasoning.

One of the obstacles on the field of text generation has been the objective evaluation of the generated text's semantics. Correct spelling and grammar are easy to evaluate, however the meaning of the generated text can be challenging to evaluate with an automated metric []. This problem is further divided into cases when we know the target optimal result we strive for [5][1] and when even that is unknown (e.g., creating a poem). [10][4]

Our work is based off the following papers the most. Luo et al. [3] propose a novel Auto-Encoder Matching model to learn utterance-level dependency for generating everyday dialogue. Three neural networks are used: LSTM for encoding a reply into its semantical representation, then a feedforward network for mapping the reply semantic into the answer semantic. Lastly a LSTM decoder is used for the sentence generation. Potash, Romanov and Rumshisky [7] demonstrated the generation of rap songs using LSTM. Netzer et al. [4] explored the usage of Word Association Norms (WAN) to generate Haiku poetry.

In our approach of generating Haiku poetry we used LSTM as this enabled us to replicate the rhythm and other specifics of Haikus (e.g., frequent phrases and writing style). [7] We tried a new approach regarding the relation between verses by treating them as replies in a dialog. Our method therefore consists of first generating the starting verse using LSTM, then using the encoder/decoder approach for generating the next two verses, treating it like a dialog generation.

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4. CONCLUSIONS

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5. ACKNOWLEDGMENTS

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