Improving Memory in Recurrent Neural Networks

Background

Understanding language requires **memorizing the right stuff** and forgetting all the rest**.** How brain manages it? Nobody really knows….

Artificial Neural Networks are used to solve engineering tasks in the way that brain does. They have recently became a popular tool for a variety of Language related tasks.
Recently many engineering systems based on Artificial Neural Networks were proposed ranging from introducing explicit memory cells to just initializing weights appropriately in a vanilla RNN framework.

Project Goals

We will train an artificial recurrent neural network to perform a memory requiring task, based on a recent work by Facebook Research [1]. We will then try to make the memory writing process less supervised. Namely, we will not tell the network what details of input data worth (memorizing), instead we will:

1. Offer a training set of a gradually increasing complexity. (curriculum learning [2])
2. Try a simpler network architecture, so that the internal dynamics of the network become more trackable.

Prerequisites

- Python programming skills
- Interest in Deep Learning, Natural Language Processing and some Biology.

Bibliography

[1] Weston, Jason, et al. "Towards ai-complete question answering: A set of prerequisite toy tasks." *arXiv preprint arXiv:1502.05698* (2015).
[2] Bengio, Yoshua, et al. "Curriculum learning." *Proceedings of the 26th annual international conference on machine learning*. ACM, 2009.
[3] Mikolov, Tomas, et al. "Learning longer memory in recurrent neural networks." *arXiv preprint arXiv:1412.7753* (2014).

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