

Lifelong Learning With Dynamically Expandable Networks – Reproducibility Report

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Motivation

Lifelong learning (Thrun, 1995), the problem of continual learning where tasks arrive in sequence, is an important topic in transfer learning. The primary goal of lifelong learning is to leverage knowledge from earlier tasks for obtaining better performance, or faster convergence/training speed on models for later tasks. While there exist many different approaches to tackle this problem, we consider lifelong learning under deep learning to exploit the power of deep neural networks. Fortunately, for deep learning, storing and transferring knowledge can be done in a straightforward manner through the learned network weights. The learned weights can serve as the knowledge for the existing tasks, and the new task can leverage this by simply sharing these weights.

Introduction

In this report we are going to show our results of attempted reproduction of a recent conference paper from ICLR, called "Lifelong Learning With Dynamically Expandable Networks" which proposes a novel deep neural network for lifelong learning, called "Dynamically Expandable Network". It performs partial retraining of the network trained on old tasks by exploiting task relatedness, while increasing its capacity when necessary to account for new knowledge required to account for new tasks, to find the optimal capacity for itself, while also effectively preventing semantic drift.

Reproducibility

Available Information Overview

In this section, we list important reproducibility metrics.

Dataset

We use the same datasets as those used in the paper.

1. CIFAR-100
2. MNIST-Variation

Data preprocessing

TODO: Z jakiego preprocessingu korzystamy?

Dataset Partitions

For the MNIST dataset, the authors of DEN paper use 1,000/200/5,000 images for train/val/test split for each class. They form each task to be one-versus-rest binary classification.

TODO: Jak my dzielimy datasety?

Model training


Model Assessment

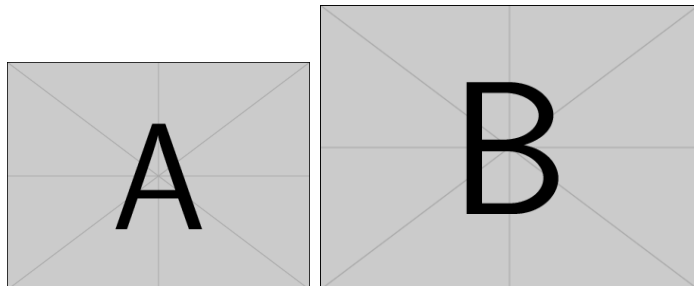
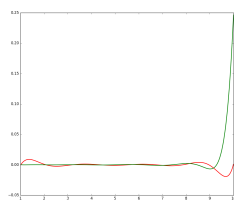
Randomization control

Software Environment

Hardware Environment

Results

The following image does not show any wombats .



Conclusion

Conclusion.

References

- [1] Leslie Lamport, *LaTeX: a document preparation system*, Addison Wesley, Massachusetts, 2nd edition, 1994.