SCIENCE · PASSION · TECHNOLOGY

Open Thesis / Project

What Is Lost in Compressed Unsupervised Trained Models?

(Embedded Information Processing Team)

Motivation

Neural network pruning methods have demonstrated that it is possible to achieve high network compression levels with surprisingly little degradation to test set accuracy. One the one hand, different classes are disproportionately impacted by network pruning, and some examples seem to be easier to forget than others, as recent work shows (https://arxiv.org/abs/1911.05248). These examples include data points in the long-tailed part of the distribution, examples that are incorrectly or imprecisely labeled, examples that have multiple labels, etc.. On the other hand, a different line of research (https://arxiv.org/abs/2010.08127) shows that unsupervised or semi-supervised settings like contrastive learning, helps out-of-distribution generalization. However, we don't know if the same examples are also easily lost in this training regime. Your task is to find our! **Interested? Contact us for more details!**

Target Group

Students in ICE or Computer Science.

Thesis Type

Master Project / Master Thesis.

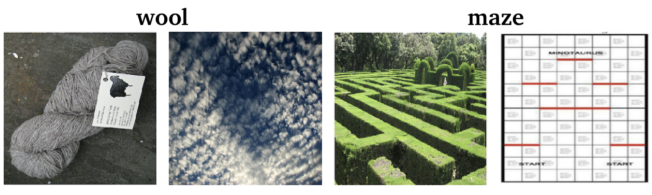

Image source: https://arxiv.org/pdf/1911.05248.pdf

PIE = Pruning Identified Exemplars. Conducted research discussed in the reference paper applies to the supervised training regime. A comparison to unsupervised / semi-supervise is of the main interest of this work.

Goals and Tasks

In this project, you will follow the design of experiments in the published paper conducting the study for networks trained in a supervised regime. You will then train a network in a semi-supervised manner for the same task, make sure you achieve better generalization on unseen data, and try to characterize the properties of examples that a compressed network forgets.

- Literature review on generalization, network compression and the properties of examples the network easily forgets;
- Repeat experiments described in the published paper solving the same task for a supervised training regime;
- Train a network in an unsupervised / semi-supervised fashion, compress it and analyze / classify the examples that get forgotten. Think of a theory which examples get lost;
- Summarize obtained results in in a written report and given an oral presentation.

Requirements / Skills:

- Good knowledge of deep learning and relevant experience;
- Interest to explore and understand properties of sparse deep networks, and working on a previously unsolved problem;
- Programming skills in Python, experience with PyTorch.

Used Tools / Equipment:

- A laptop (GPU infrastructure will be provided)
- Your talent (very important!).

Contact Person

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