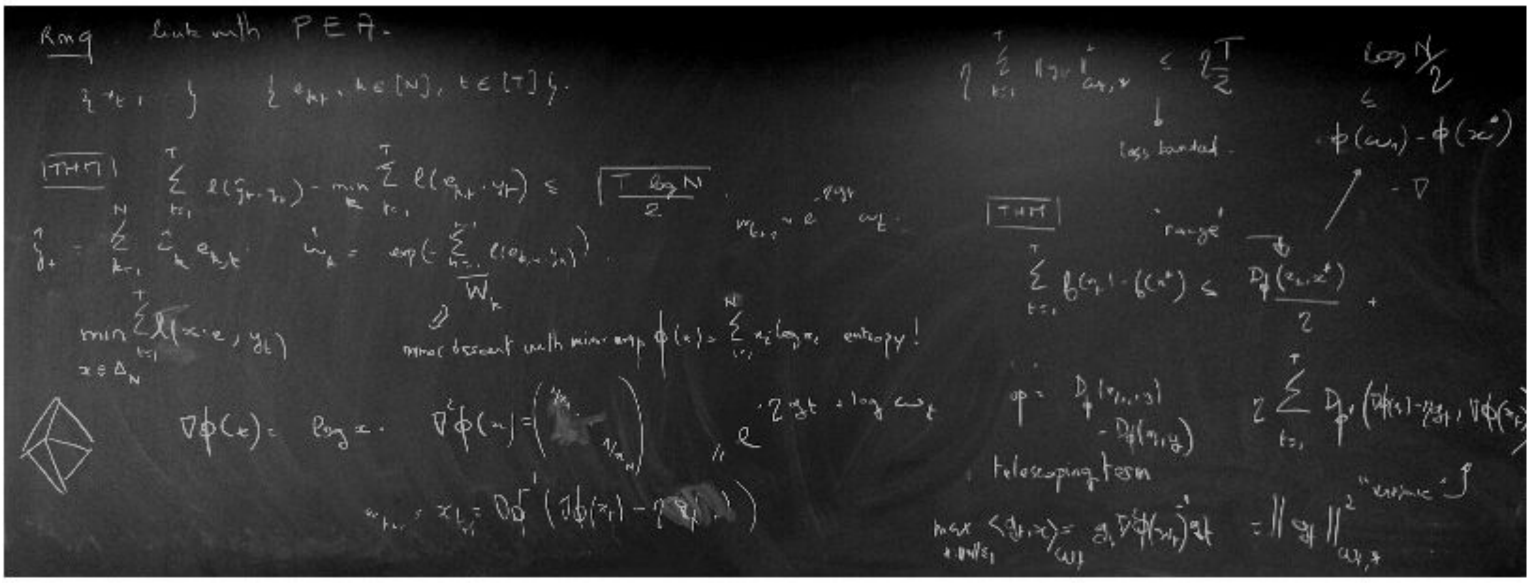
GreenAI UPPA

The GreenAI UPPA team is an engaged lab that improves state-of-the-art machine learning algorithms. Concerned with our impact on earth, we develop low consumption algorithms and tackle environmental challenges. Unlike other research groups, our activities are dedicated to the full pipeline from the math grounding to R&D prototype and in production deployment with industrial partners. We are based in Pau, France, in front of the Pyrénées.

Our research



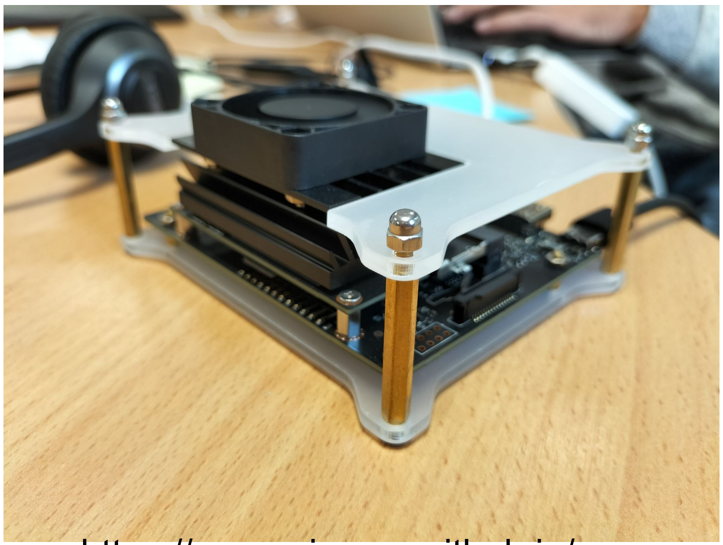
Our research encompasses diverse projects and collaborations around the mathematical foundations of power-efficient deep/machine learning algorithms, and the applications of AI to build a more sustainable world. In this section, we present the mathematical as well as the algorithmic part of our activity.

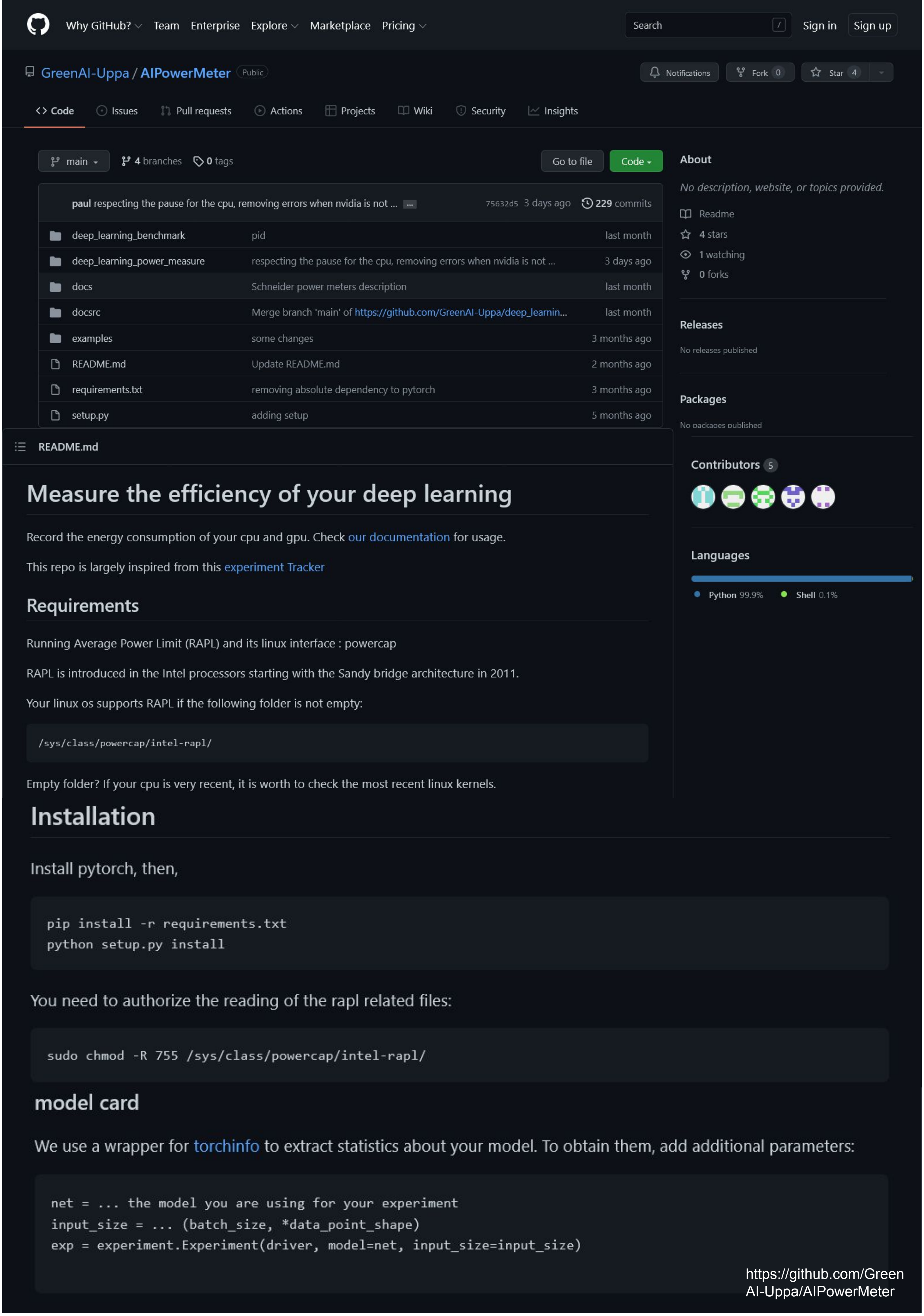
Theory and algorithms

Deep Learning has become extremely popular to solve many supervised machine learning problems. This standardization of machine learning, namely computing on GPU a stochastic gradient descent is not only a plague for science but also a disaster in terms of power consumption. Recently, a growing interest is observed in the deep learning hype in order to reduce computational cost by designing lighter architectures. Several approaches for reducing the computational effort of NNs have been proposed (e.g. binarized networks or pruning methods). Moreover, promising strategies propose to select the connectivity of the network, or more generally the architecture, during the training process.

GreenAI UPPA expects to address these issues, based on both a theoretical and practical machine/deep learning analysis of standard pipeline and new paradigms. More precisely, we propose alternatives to standard deep learning pipelines in order to rethink the learning process and show how mathematical statistics could help us to select lighter algorithms and reduce training, inference complexity and environmental impact of machine learning.

Measure the hungriness of your deep learning: We measure the power consumption of recent architectures on different hardwares through our AIPowerMeter based on RAPL and nvidia-smi.





paul respecting the pause for the cpu, removing errors when nvidia is not ... 75632d5 3 days ago 229 commits

deep_learning_benchmark	pid	last month
deep_learning_power_measure	respecting the pause for the cpu, removing errors when nvidia is not ...	3 days ago
docs	Schneider power meters description	last month
docsrc	Merge branch 'main' of https://github.com/GreenAI-Uppa/deep_learnin...	last month
examples	some changes	3 months ago
README.md	Update README.md	2 months ago
requirements.txt	removing absolute dependency to pytorch	3 months ago
setup.py	adding setup	5 months ago

About

No description, website, or topics provided.

Readme
4 stars
1 watching
0 forks

Releases

No releases published

Packages

No packages published

Contributors 5

Languages

● Python 99.9% ● Shell 0.1%

README.md

Measure the efficiency of your deep learning

Record the energy consumption of your cpu and gpu. Check our documentation for usage.

This repo is largely inspired from this experiment Tracker

Requirements

Running Average Power Limit (RAPL) and its linux interface : powercap

RAPL is introduced in the Intel processors starting with the Sandy bridge architecture in 2011.

Your linux os supports RAPL if the following folder is not empty:

```
/sys/class/powercap/intel-rapl/
```

Empty folder? If your cpu is very recent, it is worth to check the most recent linux kernels.

Installation

Install pytorch, then,

```
pip install -r requirements.txt
python setup.py install
```

You need to authorize the reading of the rapl related files:

```
sudo chmod -R 755 /sys/class/powercap/intel-rapl/
```

model card

We use a wrapper for torchinfo to extract statistics about your model. To obtain them, add additional parameters:

```
net = ... the model you are using for your experiment
input_size = ... (batch_size, *data_point_shape)
exp = experiment.Experiment(driver, model=net, input_size=input_size)
```

https://github.com/Green AI-Uppa/AIPowerMeter