

DL - Project Proposal

Team Name : Indizone Deep Code Group

Project Title : Transformer Adapter

Motivation and Summary

- Training a model for a down-stream NLP Task is often a tedious process. It involves transferring the weights from a pre-trained model, fine-tuning the top-layer weights and then co-training them for one particular task. This involves a lot of computation and storage and is not efficient for multi-task applications. Training models for multiple tasks were tried, but that resulted in challenges during training resulting in poor performance.
- Adapter based training aims to solve the above problems by catering to multiple tasks and minimizing task specific parameters at the same time. This helps prevent overfitting, enables sequential training on various tasks and helps keep the model modular for easier sharing and updates.

Approach

- We will take a sequence of tasks and pass it in a stream to our model
- The model is tied up with an adapter which adds some very small parameters per task
- It also uses the fine tuning technique to improvise on these tasks from previous tasks
- Basically, the adapter will try to solve one task at a time but having a memory of all the tasks that it has completed earlier and also learning from them

Ethical Implications

No direct ethical implications for this project.

Resources

- <https://course.fast.ai/#using-a-gpu>
- <https://adapterhub.ml/>
- <https://huggingface.co/transformers/>

Related Work

1. Suchin Gururangan, Ana Marasović, Swabha Swayamdipta, Kyle Lo, Iz Beltagy, Doug Downey, Noah A. Smith, "[Don't Stop Pretraining: Adapt Language Models to Domains and Tasks](#)", In ACL 2020.
2. Neil Houlsby, Andrei Giurgiu, Stanislaw Jastrzebski, Bruna Morrone, Quentin de Laroussilhe, Andrea Gesmundo, Mona Attariyan, Sylvain Gelly, "[Parameter-Efficient Transfer Learning for NLP](#)", In ICML 2019.
3. McCloskey, M. and Cohen, N. J., "Catastrophic interference in connectionist networks: The sequential learning problem", In Psychology of learning and motivation. 1989.
4. Jonas Pfeiffer, Andreas Rücklé, Clifton Poth, Aishwarya Kamath, Ivan Vulić, Sebastian Ruder, Kyunghyun Cho, Iryna Gurevych, "[AdapterHub: A Framework for Adapting Transformers](#)", arXiv preprint.
5. Jonas Pfeiffer, Aishwarya Kamath, Andreas Rücklé, Kyunghyun Cho, Iryna Gurevych, "[AdapterFusion: Non-Destructive Task Composition for Transfer Learning](#)", arXiv preprint.
6. Sylvestre-Alvise Rebuffi, Hakan Bilen, Andrea Vedaldi, "[Learning multiple visual domains with residual adapters](#)", In NeurIPS 2017.

Datasets

- arXiv Dataset (Kaggle): <https://www.kaggle.com/datasets/Cornell-University/arxiv>
- Datasets from [Don't Stop Pretraining: Adapt Language Models to Domains and Tasks](#): <https://github.com/allenai/dont-stop-pretraining/blob/master/environments/datasets.py>

List your Group members

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