Proposal for project1: Investigation on MAML

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1 Introduction

In this project, we plan to follow MAML [1], a milestone paper in meta-learning area, which proposed a fast adaptation algorithm as a meta-learning and applied it on some supervised learning tasks and reinforcement learning tasks. In that paper, the algorithm for meta-learning that is model-agnostic, in the sense that it is compatible with many models that trained with gradient descent and applicable to a variety of different learning problems, including classification, regression, and reinforcement learning in the few-shot scenario.

2 Proposal

In this project, we plan to conduct an empirical study and investigation on MAML. we will implement following ideas and experiments:

1. Reproduce MAML on Image classification and Study how to make it work. (with Omniglot and MiniImagenet dataset)
2. Conduct the ablation & hyper-parameter study on mage classification tasks.
3. Try MAML on some new datasets.
4. Try to improve MAML with some practical strategies.
5. Give some analysis on MAML based on our experience.

3 Motivation

From this assignment, we hope to have a better understanding on:

1. The usage of popular deep learning tools.
2. The key point to run a deep learning algorithm, especially the meta-learning algorithm.
3. The behavior of meta-learning algorithm under different setting.
4. How to apply meta-learning algorithm to a new task.

4 Division of labor

Lanqing Xue: reproduce and conduct an empirical on Omniglot dataset.

Jianyue Wang: reproduce and conduct an empirical on MiniImagenet dataset.

Han Feng: Apply MAML on new dataset.

Zhiliang Tian: Imporve MAML and give some advices.

We will divide the labor to implement separately and write the report together.

References

[1] Chelsea Finn, Pieter Abbeel, and Sergey Levine. Model-agnostic meta-learning for fast adaptation of deep networks. In *Proceedings of the 34th International Conference on Machine Learning-Volume 70*, pages 1126–1135. JMLR. org, 2017.