ML2022-2023 Spring HW15 Report

Public Score (Accuracy)	Private Score (Accuracy)
0.97291	0.95681

Report Questions

Part 1: Number of Tasks

Q1

Plot the relation between dev accuracy and the number of tasks. Include at least three different experiment in the figure. (1pt)

Answer:
Since the difference of accuracies are not obvious, we use a table to do comparisons instead of figure. Since the number of tasks depends on the batch size, we can tune this hyperparameter to do comparisons as follows:

Batch Size	Private Score (Accuracy)	Public Score (Accuracy)
16	0.95511	0.96736
32	0.94886	0.96250
64	0.93579	0.94930

And we ensemble all the three files to get the final version, which exceeds the boss baeline.

Q2

A one sentence description of what you observe from the above figure. (1pt)

Answer: The accuracies decrease wih the increase of batch size(task number in training).

Part 2: Please read How to train your MAML and answer the questions according to the paper.

Q1

Please write down one of the problems that occur when using MAML and explain why it happens. (1pt)

Answer:
(From ChatGPT) One of the problems that occur when using MAML (Model-Agnostic Meta-Learning) is the "overfitting to the meta-training set." This happens because MAML aims to optimize for quick adaptation to new tasks by learning a good initialization. However, during this process, the model can overfit to the specific tasks seen during the meta-training phase, which may not generalize well to unseen tasks. The nature of the meta-learning objective, which involves multiple gradient updates on the same set of tasks, can exacerbate this overfitting issue, making the model less effective at generalizing to new tasks.

Q2

Please write down the solution to the problem you mentioned in the first question. (1pt)

Answer:
(From ChatGPT) One solution to the overfitting problem in MAML is to incorporate regularization techniques during meta-training. Regularization methods such as dropout, weight decay, or data augmentation can help prevent the model from overfitting to the meta-training tasks. By introducing these techniques, the model is encouraged to learn more robust and generalizable features, improving its performance on new, unseen tasks. Additionally, using a larger and more diverse set of meta-training tasks can also help mitigate overfitting by exposing the model to a wider variety of scenarios during training.