Machine Learning HW15
Meta Learning

ML TAs
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Outline

- Task Description
- Data Format
- Grading
- Submission
- Regulations
- Contact
Task: Few-shot Classification

The Omniglot dataset
Task: Few-shot Classification

The Omniglot dataset
- background set: 30 alphabets
- evaluation set: 20 alphabets

Problem setup: 5-way 1-shot classification
Task: Few-shot Classification

Training MAML on Omniglot classification task.
Data Format

Training / validation set:

30 alphabets
- multiple characters in one alphabet
- 20 images for one character
Data Format

Testing set:

640 support and query pairs
- 5 support images
- 5 query images
Guidance - Simple Baseline

Simple transfer learning model (implemented in sample code)

training
- normal classification training on randomly chose five tasks

validation / testing
- finetune on the five support images, and do inference on query images
Guidance - Medium / Strong Baseline

Finish the TODO blocks for meta learning inner & outer loop (in sample code)

Medium baseline
- FO-MAML

Strong baseline
- MAML / ANIL

- Original MAML: slides p.12 - p.18 & p. 21 - p. 26
- First-order approximation MAML (FO-MAML): slides p. 24 - 27
- Reptile: slides p. 29 - p. 31
- MAML tips: How to train your MAML?
- ANIL: Feature reuse
Guidance - Boss Baseline

Task augmentation (with meta learning)

- What is a reasonable way to create new task?
Grading - Baseline Guide 1/3

- **Simple baseline (acc ~ 0.6)**
  - Transfer learning (sample code)

- **Medium baseline (acc ~ 0.7)**
  - Meta learning (FO-MAML)

- **Strong baseline (acc ~ 0.9)**
  - Meta learning (MAML)

- **Boss baseline (acc ~ 0.95)**
  - Meta learning (MAML) + task augmentation
Grading - Baselines 2/3

- Simple baseline (public) +0.5 pt
- Simple baseline (private) +0.5 pt
- Medium baseline (public) +0.5 pt
- Medium baseline (private) +0.5 pt
- Strong baseline (public) +0.5 pt
- Strong baseline (private) +0.5 pt
- Boss baseline (public) +0.5 pt
- Boss baseline (private) +0.5 pt
- Report +4 pts
- Code submission +2 pts

Total: **10 pts**
Grading - Bonus

If your ranking in private set is top 3, you can choose to share a report to NTU COOL and get extra 0.5 pts.

About the report (report template)
- Your name and student_ID
- Methods you used in code
- Reference
- In 200 words
- Deadline is a week after code submission (7/8)
- Please upload to NTU COOL’s discussion of HW15
Report questions (4%)

Part 1: Number of Tasks

- According to your best meta-learning result, plot the relation between dev accuracy and the number of tasks. Include at least three different experiment in the figure. (1pt)

- A one sentence description of what you observe from the above figure. (1pt)
Part 2: Inner Update Steps

- According to your best meta-learning result, plot the **relation between dev accuracy and the inner update step at inference** (noted that you should not change the inner update step at training, it should be the same with your best meta-learning result throughout the experiment). Include at least three different experiment in the figure. (1pt)

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

- Colab
- Kaggle
- Report (On Gradescope)
Submission - Deadlines

- Kaggle, Report (GradeScope), Code Submission (NTU COOL)

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No late submission!
Submit early!
Submission - NTU COOL

- NTU COOL
  - Compress your code into
    
    `<student ID>_hwX.zip`

    * e.g. b06901020_hw15.zip
    * X is the homework number

  - We can only see your last submission.
  - Do not submit your model or dataset.
  - If your code is not reasonable, your semester grade x 0.9.
Regulations 1/2

- You should NOT plagiarize, if you use any other resource, you should cite it in the reference. (* )
- You should NOT modify your prediction files manually.
- Do NOT share codes or prediction files with any living creatures.
- Do NOT use any approaches to submit your results more than 5 times a day.
- Do NOT search or use additional data.
- You are allowed to use pre-trained models on any image datasets.
- Your final grade x 0.9 if you violate any of the above rules.
- Prof. Lee & TAs preserve the rights to change the rules & grades.

(* ) Academic Ethics Guidelines for Researchers by the Ministry of Science and Technology
If you have any question...

● NTU COOL (recommended)
  ○ HW15 discussion board

● Kaggle discussion

● Email
  ○ mlta-2022-spring@googlegroups.com
  ○ The title should begin with “[hw15]”
Post-test Questionnaire (後測問卷)

教育部後測問卷

學生心得問卷

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