Homework1
Image Classification

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Introduction

- In this assignment, you will practice constructing a neural network using **PyTorch** and training it to perform a classification task.
- To ensure that students can meet the assignment's requirements, the use of pretrained weights and existing models, such as those built with torchvision, is not permitted.

What to do?

You're tasked with completing at least 3 Python Files: *model.py, train.py, test.py*

You need to implement your neural network inside *model.py* and named it as "ClassificationModel". This network should be rendered accessible to both *train.py* and *test.py* through import.

Within these files, you can import any package and design any additional classes or functions if you need. However, the utilization of ready-made neural network and pre-trained weight is forbidden. Discovery of any infringement of this cardinal rule will incur a penalty of a zero score for this assignment.

Dataset

Link: https://drive.google.com/drive/folders/1zLaG1QiWVc7eHV7aRZj70wtShGAU3mzY?usp=sharing

1. The download link for the dataset will expire upon the deadline of HW1.
2. This dataset consists of sports images from 100 different categories. The size of each image is 224*224*3.
3. A total of 10000+ images are provided for training and 500 images for testing.
4. We haven't provided a validation set, so if you want to evaluate the performance of your model, you must need to split a validation set from the provided training set.

Grading

- ***Top-5 Accuracy (80 points)***

  65% <= Accuracy, get full points

  60% <= Accuracy < 65%, get 70 points

  55% <= Accuracy < 60%, get 60 points

  50% <= Accuracy < 55%, get 50 points

  Accuracy < 50%, get 0 points

- ***Number of Parameters (20 points)***

  This evaluation is based on the number of parameter of your model. The fewer parameters you use, the higher score you will get.

  Score formula: $$\text{Round}\left(\frac{(n-r)}{(n-1)} \times 20\right)$$

  n: number of students

  r: your ranking (r = 1 being the best rank)

Grading

- You can use the given file *weight.py* to evaluate your model parameters.

weight.py

to_student > weight.py

```python
from model import ClassificationModel

if __name__ == "__main__":
    model = ClassificationModel()
    total_params = sum(p.numel() for p in model.parameters())
    print("# parameters:", total_params)
```

```
$ python3 weight.py
# parameters: 15556
```

Grading

hw1_{student_id}.zip

- ├ model.py
- ├ train.py
- ├ test.py
- ├ [other python files you add]
- └ w_{student_id}.pth

After cd to folder, and put dataset in to the folder, *TA will execute "python test.py".*

You need to output "pred_{student_id}.csv" base on the weight(.pth) you provided. And we will evaluate your accuracy according to your output(.csv).

example.csv

dataset > example.csv

```
file_name,pred1,pred2,pred3,pred4,pred5
000.jpg,air hockey,ampute football,archery,arm wrestling,axe throwing
001.jpg,air hockey,ampute football,archery,arm wrestling,axe throwing
002.jpg,air hockey,ampute football,archery,arm wrestling,axe throwing
003.jpg,air hockey,ampute football,archery,arm wrestling,axe throwing
004.jpg,air hockey,ampute football,archery,arm wrestling,axe throwing
005.jpg,air hockey,ampute football,archery,arm wrestling,axe throwing
006.jpg,air hockey,ampute football,archery,arm wrestling,axe throwing
007.jpg,air hockey,ampute football,archery,arm wrestling,axe throwing
008.jpg,air hockey,ampute football,archery,arm wrestling,axe throwing
009.jpg,air hockey,ampute football,archery,arm wrestling,axe throwing
```

Your pred_{student_id}.csv should looks like.

Penalty

Format penalty - 10 points
- If you have any incorrect file format or name, then you will get -10 points.

Late penalty - 10% per day

Submission

- **Your submission should contain:**
  - Network Structure: *model.py*
  - Train: *train.py*
  - Inference: *test.py*
  - Model Weight: *w_{student_id}.pth*

```
hw1_{student_id}.zip
├ model.py
├ train.py
├ test.py
├ [other python files you add]
└ w_{student_id}.pth
```

Compress them into One zip file name hw1_{student_id}.zip.

Don't contain dataset in your submission