Deep Learning –HW#4

About the Assignment

The main aim of the assignment is to gain some fundamental knowledge about deep learning on Python. The gains of this homework are:

- Able to design a CNN model
- Able to setting the parameter of a CNN model
- Able to use to Pytorch or Keras library
- Able to analyze performance of a model
- Able to save and load a CNN model

Tasks:

Layers	Filter
Input (224x224x3)	
c1 = Conv1+ Activation(Swish)	3x3, p=1, s=1
c2 = Conv2+ Activation(Swish)	3x3, p=1, s=1
c3 = Conv3+ Activation(Swish)	3x3, p=1, s=1
out1 = c1+c3	
c4 = Conv4+ Activation(Swish)	3x3, p=1, s=2
c5 = Conv5+ Activation(Swish)	3x3, p=1, s=2
c6 = Conv6+ Activation(Swish)	3x3, p=1, s=2
out2 = c4+c6	
c7 = Conv7+ Activation(Swish)	3x3, p=1, s=2
c8 = Conv8+ Activation(Swish)	3x3, p=1, s=2
c9 = Conv9+ Activation(Swish)	3x3, p=1, s=2
out3 = c7+c9	
out4=AveragePooling2D	
out5=flatten	
out6=linear(2048)	
out7=linear(1024)	
out8=linear(num_classess)	

Fig. 1: CNN Model.

Download the netron exe to plot your model. First you will convert your model to onnx file, then open with netron to visualize model internal layers.

You are expected to implement the CNN model given in Fig. 1. The train data is consisting of Caltech Tiny images.

In case of converting 2-D outputs to 1-D format, you can use flatten layer.

1- Implement this CNN model by using Pytorch
2- Plot your model with netron
3- The activation function is **Swish**.
4- Train this model and evaluate the model on test images.
5- define the following settings.

Optimizer: Adam, Learning rate = 1e-3, batch-size=16, epoch=60,

```
scheduler = torch.optim.lr_scheduler.MultiStepLR(optimizer, milestones=[20, 40], gamma=0.3)
```

it means that you should drop the learning with a defined epoch interval.

6- Save model with torch.save
7- Load model and evaluate model with test samples.
8- Show the confusion matrix, accuracy, f-score of the model.

download colab notebook file with outputs, and also write results and details to pdf file.

Send colab notebook and pdf as zip file

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