DL Applications in Computer Vision

Objective: This assignment has two objectives:

1. Understanding how to implement Image Classification model using PyTorch.
2. Develop a pipeline to solve the MNIST classification problem and output model accuracy.

Problem: Write a Python program using the provided template to train and test a partial MNIST dataset using a modified AlexNet as shown below. The program should accept three integers as command line input. First two integers define the labels of the two-class classification and third integer represents the number of epochs for training. Output only the final model accuracy and nothing else.

Feature Extractor:

Layer	Filters	Filter Size	Stride	Padding	Feature Size	Activation
Input					1 × 28 × 28	
Conv2D	32	5	1	1	32 × 26 × 26	ReLU
Conv2D	64	3	-	1	64 × 26 × 64	ReLU
MaxPool2D	-	2	2	-	64 × 13 × 13	-
Conv2D	96	3	-	1	96 × 13 × 13	ReLU
Conv2D	64	3	-	1	64 × 13 × 13	ReLU
Conv2D	32	3	-	1	32 × 13 × 13	ReLU
MaxPool2D	-	2	1	-	32 × 12 × 12	-

Classifier:

Layer	Feature Size	Activation
Dropout	4608	
Linear	2048	ReLU
Dropout	2048	
Linear	1024	ReLU
Linear	10	

Note: Even if there are two classes, we output 10 features in the last Linear layer for correct mapping.

Instructions: Download the dataset along with template program and write your code in the designated location mentioned in the comments only**. You are required only to write the sequential model for feature extractor, classifier and forward (feature extractor THEN classifier). The dataset must be in the current working directory with the structure** data/MNIST/raw/*. You should read the skeleton code to understand the exact mechanism of input from the command line and provide the required output. To train and test modified AlexNet with 1 and 2 MNIST classes with 4 training epochs, the command line input should be: python assignment.py 1 2 4

Execution Syntax: python assignment.py <number> <number> <number>

Sample Test Cases:

Input	4 5 3	1 2 3	1 2 2	4 9 3	8 7 5
Output	97.97	97.52	78.10	79.41	95.21