# 進階機器學習 Advanced Machine Learning

Homework #2
Due 2025 March 26 11:00PM

The dataset **HW2_MNIST_train.zip** contains handwritten digit images. Different from the standard MNIST dataset, the resolution of each image is 128 x 128. Each image contains **one** digit from 0 to 9. There are two different sizes of handwritten digits in the image as shown in the following examples. The digit can be located in any location of the image.
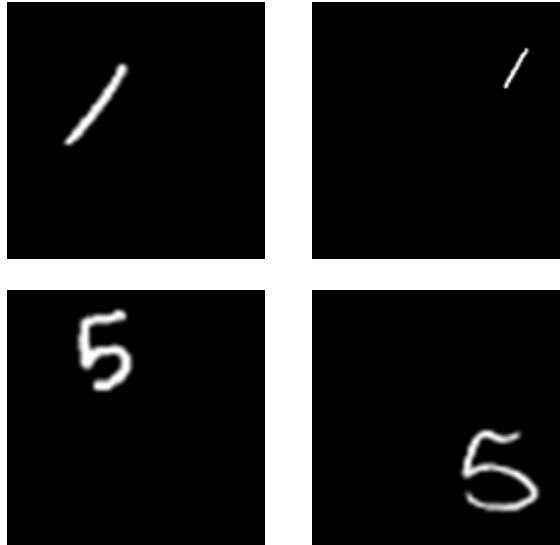
The label of each image contains the class of the images with the associated bounding box which includes the (x,y) location, width and height of the digit.

In this assignment, you should design a deep neural network which only has to predict the digit number of the image. You should provide:

1. (15%) The confusion matrix, the top-1 and top-3 accuracy of your training result.

2. (15%) List number of layers and parameters used in your architecture. Calculate the value of $\frac{top-1\ accuracy}{\#\ of\ parameter}$. If the metric is higher, you'll get higher score for this sub-problem.

3. (70%) The prediction result of the enclosed **HW2_MNIST_test.zip**. You have to submit the entire program and a CSV file **HW2_prob1.csv** with the following format.

	A	B	C
1	image	class	
2	0000000.png	0	
3	0109539.png	8	

All the files used in this homework can be downloaded from the website:
https://drive.google.com/drive/folders/1FYhNxaQm2C9SspA1snAnKyCV1G0wl KrQ?usp=sharing