

# NYCU Introduction to Machine Learning, Homework 5

**Deadline: Dec 20, 23:59**

## Coding (100%):

In this coding assignment, you need to implement the deep neural network by any deep learning framework, e.g. Pytorch, TensorFlow, or Keras, and train the DNN model on the dataset we prepared.

## Join the competition [HERE](#)

You must set the team's name as your **Student ID**, otherwise, you get 0 points.

## Download dataset [HERE](#).

In the dataset, there are 3 tasks for this homework, what you have to do is to train your model on the training set (the ./train/task{0,1,2} folder) and inference on the test set (the ./test/task{0,1,2} folder).

You have to make a CSV file for your model's prediction and upload it to [here](#). Your score depends on your performance on Kaggle.

1. (65%) Classifying the character (0~9) in a 72\*72 image.
2. (25%) Classifying two characters (a-z, 0~9) in a 72\*72 image. (Order does matter)
3. (10%) Classifying four characters (a-z, 0~9) in a 96\*72 image. (Order does matter)
4. (0% / -100%) Zip all your code for this homework and submit it to E3

**Note (1):** If you are a newbie in a deep learning framework, we recommend you to learn **Pytorch** or **Keras**.

- [Pytorch tutorial](#)
- [Keras tutorial](#)
- [TensorFlow tutorial](#)

You may also my [baseline code](#) as a reference if you really don't know how to start

**Note (1):** There are 10000 images in the test set, you need to have 10000 predictions in your CSV file. In the test set, there are 5000 images that are set as a public test set, and the others are set as a private test set. It means that there are two leaderboards (public leaderboard & private leaderboard). You can see your model's performance on the public leaderboard at any time, but you will only be able to know your model's performance on the private leaderboard after the deadline of this homework. Your model's performance on the private leaderboard will become your score of HW5.

**Note (2):** Please select at most 2 submissions for your final score in the private test set, we will use the better one as your score of HW5. If you only choose 1 submission, we'll use that one. If you didn't choose any of them, we'll use the score of your last submission.

**Note (3):** You may use any **open-source** pre-trained weight,  
ex: `torchvision.models.resnet18(weights="IMAGENET1K_V1")`

**Note (4):** Keyword to boost your model performance

1. Data augmentation
2. Hyperparameter searching for model structure (number of filters, number of convolution/dense layer) and optimizer (learning rate)
3. Regularization

**Note (5):** If your result is bad, check [this tutorial](#) first to debug your model  
Another reference: <https://karpathy.github.io/2019/04/25/recipe>