Introduction to Machine Learning in Engineering Science

National Cheng Kung University Department of Engineering Science

Instructor: Chi-Hua Yu

Lab 8

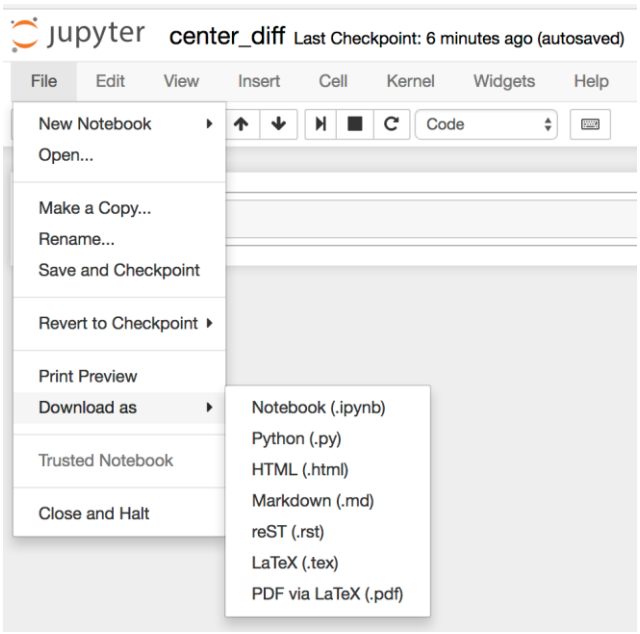
Programming, Due 11:55 am, Saturday, December 25rd, 2021

Submit by 08:00pm on 12/22 will receive a 20% bonus. Late submission before post of solution: score*0.8 (the solution will usually be posted within a week); no late submission after the post of solution

---

Lab Submission Procedure (請仔細閱讀)

1. You should submit your Jupyter notebook and Python script (`*.py`, in Jupyter, click File, Download as, Python (`*.py`)).

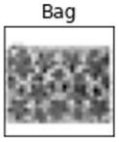


2. Name a folder using your student id and lab number (e.g., n96081494_lab1), put all the python scripts into the folder and zip the folder (e.g., n96081494_ lab 1.zip).

3. Submit your lab directly through the course website.

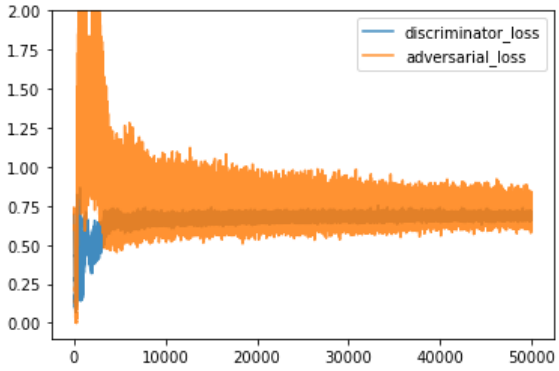
Total 100%

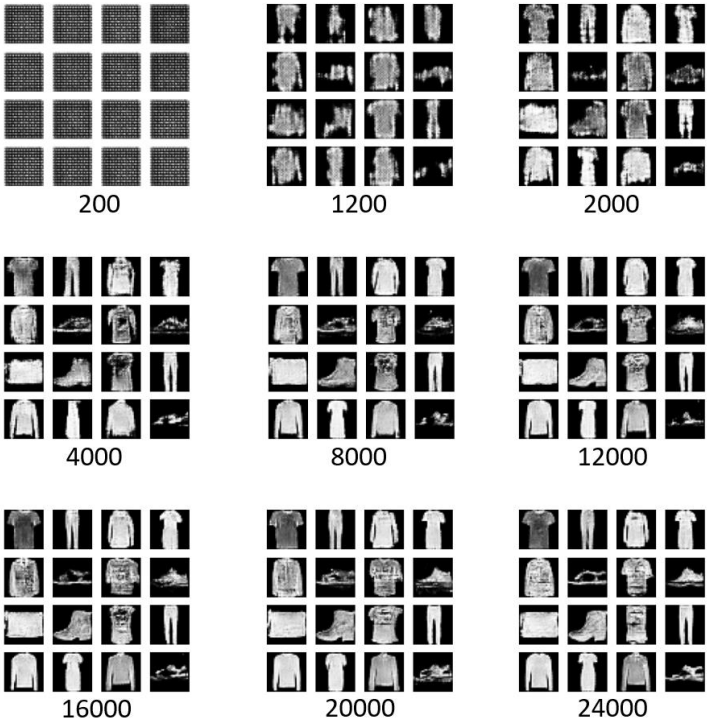
1. (100%) **Please download the zip file lab8_template.zip from Moodle.** Name your Jupyter notebook `CGAN` and Python script `CGAN.py`. Please create a CGAN model to generate grayscale pictures of clothing. Please use `from tensorflow.keras.datasets import fashion_mnist` to read the training dataset. The data contains 10 classes of labels, the classes is shown in the figure below:

Label	0	1	2	3	4
	T-shirt/top	Trouser	Pullover	Dress	Coat
					
Label	5	6	7	8	9
	Sandal	Shirt	Sneaker	Bag	Ankle boot
					

Please complete the function `build_and_train_models()` to enable CGAN to train and run on colab. Note that the input of the generator is composed by a random noise with **one-hot encoded label**.

Please plot training history and report the results of fake images generated by CGAN. The label of the fake image is the condition [0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5]. The results of fake images must contain 9 different epochs to show the process of model learning.




200
1200
2000
4000
8000
12000
16000
20000
24000