Exercise 1

Container Service

Video link : https://youtu.be/yfTfEKJtxbA

Container Service – uploading files and data

- Please download the zip file. Download link : https://reurl.cc/V54QeA
- Unzip the file and upload the folder to the server with FTP tool.
  (Upload and put MNIST folder in /workdir directory.)
- The files in Mnist folder :
  - Pytorch_Mnist.py
  - Tensorflow_Mnist.py
  - TFKeras_Mnist.ipynb
  - MNIST_data (folder)

Exercise 1.1:The Implementation of MNIST Handwritten Digit Classification (Using Jupyter notebook)

1. Create Container Site and select Tensorflow2.0 image.

Exercise 1.1:The Implementation of MNIST Handwritten Digit Classification (Using Jupyter notebook)

2. The setup of creating Container Site

(1) Please enter the information.
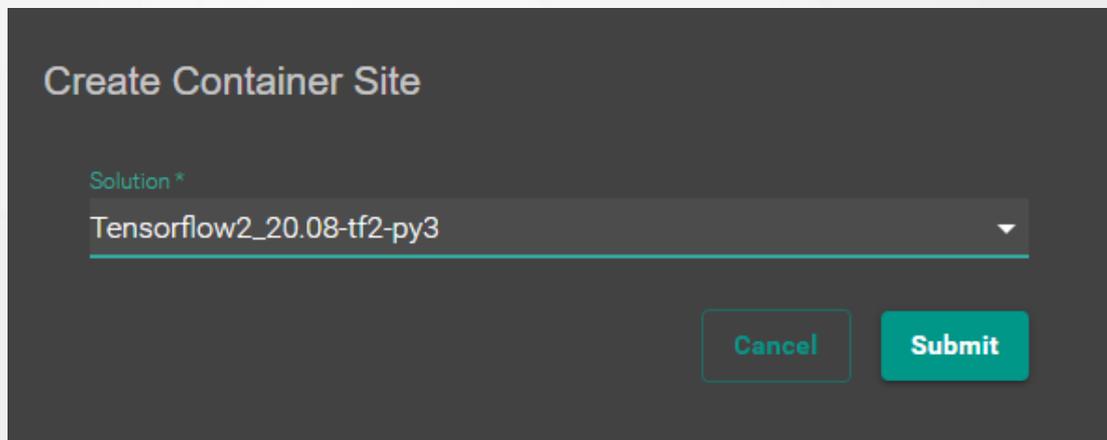
Description	e.g. Keras Mnist Training
Password	must contain at least one letter
Image	harbor.gemini.com:30003/tensorflow/tensorflow2:20.08-tf2-py3
Flavor	4CPU_30GRAM_1GPU (CPU: 4 Core, Memory: 30000 MB, GPU: 1 Core)

(2) Submit to complete the setup.

Exercise 1.1:The Implementation of MNIST Handwritten Digit Classification (Using Jupyter notebook)

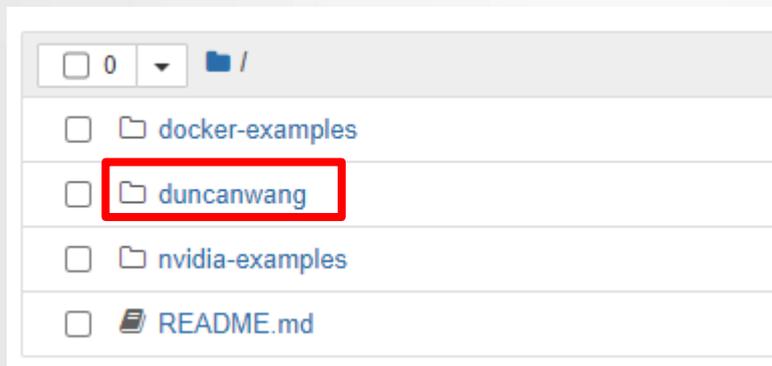3. Switch to Service Info and click on the web link.

Exercise 1.1:The Implementation of MNIST Handwritten Digit Classification (Using Jupyter notebook)

4. Enter the password to access Jupyter Notebook.

5. Click on the "username" folder and then enter into /workdir directory.

Exercise 1.1:The Implementation of MNIST Handwritten Digit Classification (Using Jupyter notebook)

6. Click on "TFKeras_Mnist.ipynb" to open the file and then run the code.

```
In [1]:  #import tensorflow
         import tensorflow as tf
```

```
In [2]:  mnist = tf.keras.datasets.mnist
         (x_train, y_train), (x_test, y_test) = mnist.load_data()
         x_train, x_test = x_train / 255.0, x_test / 255.0
         print(len(x_train))
         print(x_train[0].shape)

         Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/mnist.npz
         11493376/11490434 [==============================] - 0s 0us/step
         60000
         (28, 28)
```

```
In [6]:  model = tf.keras.models.Sequential([
           tf.keras.layers.Flatten(input_shape=(28, 28)),
           tf.keras.layers.Dense(128, activation='relu'),
           tf.keras.layers.Dropout(0.2),
           tf.keras.layers.Dense(10, activation='softmax')
         ])

         # model 每層定義好後需要經過compile
         model.compile(optimizer='adam',
                       loss='sparse_categorical_crossentropy',
                       metrics=['accuracy'])
         model.summary()

         Model: "sequential_2"

         _____
         Layer (type)                 Output Shape              Param #
         =================================================================
         flatten_2 (Flatten)          (None, 784)               0

         dense_4 (Dense)              (None, 128)               100480
```

元智大學
人工智慧跨域創新應用中心
Innovation Center for Artificial
Intelligence Applications, YZU

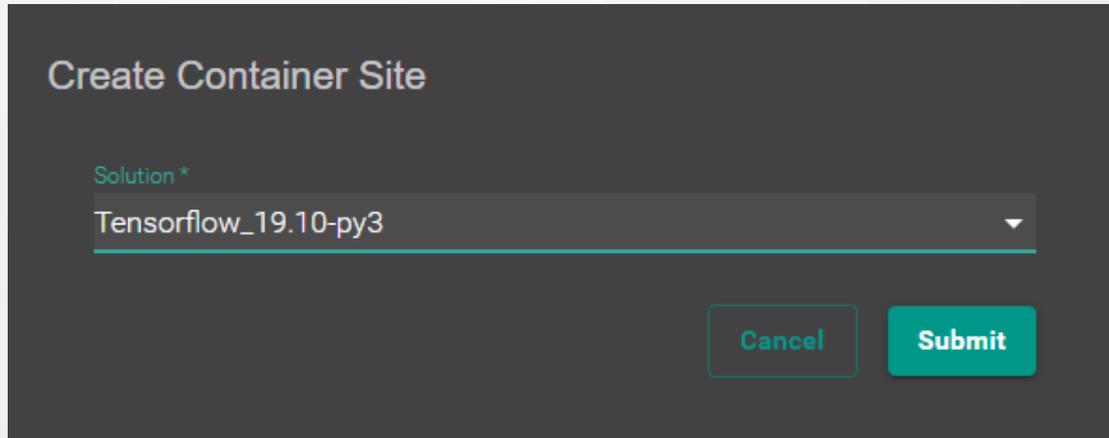# Exercise 1.2:The Implementation of MNIST Handwritten Digit Classification (Run in Terminal)

Two ways to run code in terminal (command line):

- Use SSH to connect to the container.
- Use terminal in Jupyter Notebook.

Exercise 1.2:The Implementation of MNIST Handwritten Digit Classification (Run in Terminal)

- Use SSH to connect to the container.

1. Create Container Site and select Tensorflow1.0 image.

Exercise 1.2:The Implementation of MNIST Handwritten Digit Classification (Run in Terminal)

- ### Use SSH to connect to the container.

2. The setup of creating Container Site

(1) Please enter the information.

(2) Submit to complete the setup.

Description	e.g. Mnist Training
Password	must contain at least one letter
Image	harbor.gemini.com:30003/tensorflow/tensorflow:19.10-py3
Flavor	4CPU_30GRAM_1GPU (CPU: 4 Core, Memory: 30000 MB, GPU: 1 Core)
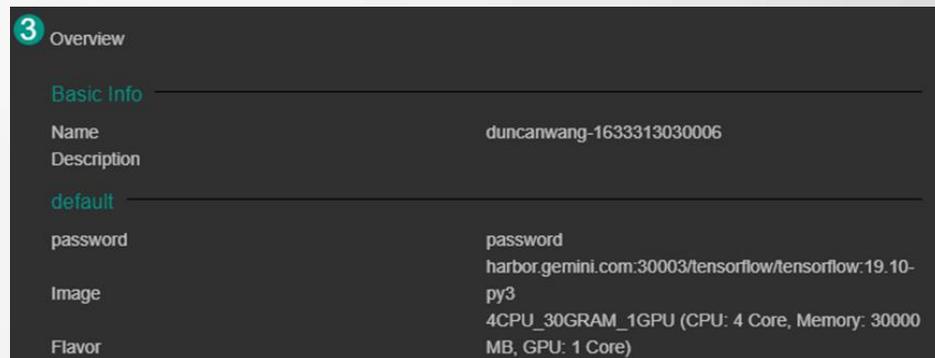
③ Overview

Basic Info

Name   duncanwang-1633313030006
Description

default

password   password

Image   harbor.gemini.com:30003/tensorflow/tensorflow:19.10-py3

Flavor   4CPU_30GRAM_1GPU (CPU: 4 Core, Memory: 30000 MB, GPU: 1 Core)

Exercise 1.2:The Implementation of MNIST Handwritten Digit Classification (Run in Terminal)

- Use SSH to connect to the container.

3. Switch to Service Info and the IP and port number for SSH connection can be seen.

Exercise 1.2:The Implementation of MNIST Handwritten Digit Classification (Run in Terminal)

- Use SSH to connect to the container.

4. SSH tools - Enter IP and port number for connection.

(PieTTY)
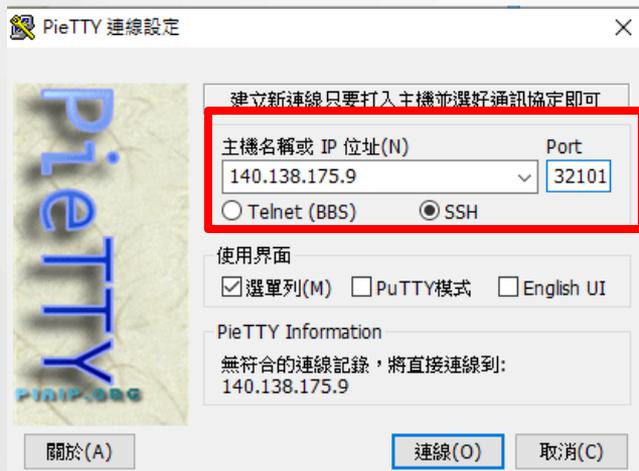
(SSH Client command used on MacOS or Linux)

Exercise 1.2:The Implementation of MNIST Handwritten Digit Classification (Run in Terminal)

- Use SSH to connect to the container.

5. Log in as root and enter the password.

Exercise 1.2:The Implementation of MNIST Handwritten Digit Classification (Run in Terminal)

- Use SSH to connect to the container

6. After login successfully, enter into /workdir directory.

command : cd /nfs_vol01/"username folder"/workdir

Exercise 1.2:The Implementation of MNIST Handwritten Digit Classification (Run in Terminal)

- ## Use SSH to connect to the container

7. Enter into Mnist folder and then execute the python code.

command : python3 Tensorflow_Mnist.py

Exercise 1.2:The Implementation of MNIST Handwritten Digit Classification (Run in Terminal)

- Use SSH to connect to the container.

8. The result of the execution shows the decline of loss and the improvement of accuracy after 100 epochs of training.

```
Train Epoch: 90 Loss= 1.6719  Accuracy= 0.97
Train Epoch: 91 Loss= 1.6358  Accuracy= 0.9698
Train Epoch: 92 Loss= 1.5792  Accuracy= 0.9696
Train Epoch: 93 Loss= 1.5632  Accuracy= 0.9698
Train Epoch: 94 Loss= 1.6421  Accuracy= 0.9702
Train Epoch: 95 Loss= 1.5896  Accuracy= 0.9688
Train Epoch: 96 Loss= 1.5296  Accuracy= 0.9702
Train Epoch: 97 Loss= 1.5179  Accuracy= 0.9728
Train Epoch: 98 Loss= 1.6063  Accuracy= 0.9704
Train Epoch: 99 Loss= 1.6737  Accuracy= 0.9694
Train Epoch: 100 Loss= 1.5871  Accuracy= 0.9718
Final Accuracy: 0.9699
root@lafrdtduncanwang-1633325250777-spdtl:/nfs_vol01/duncanwang/workdir/Mnist#
```

元智大學
人工智慧跨域創新應用中心
Innovation Center for Artificial
Intelligence Applications, YZU

Exercise 1.2:The Implementation of MNIST Handwritten Digit Classification (Run in Terminal)

- Use Terminal in Jupyter Notebook.

1. Switch to Service Info and click on the web link.

Exercise 1.2:The Implementation of MNIST Handwritten Digit Classification (Run in Terminal)

- Use Terminal in Jupyter Notebook.
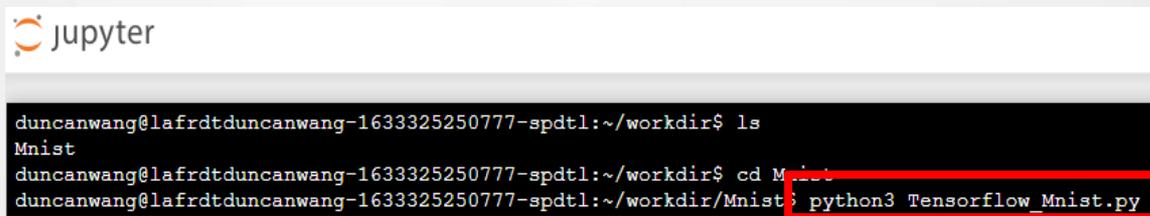
2. Click on "New" button and select "Terminal".

Exercise 1.2:The Implementation of MNIST Handwritten Digit Classification (Run in Terminal)

- Use Terminal in Jupyter Notebook.

3. Run "Tensorflow_Mnist.py" in /workdir directory.

command : cd /nfs_vol01/ "username folder"/workdir/

command : python3 Tensorflow_Mnist.py

Exercise 1.2:The Implementation of MNIST Handwritten Digit Classification (Run in Terminal)

- Use Terminal in Jupyter Notebook.

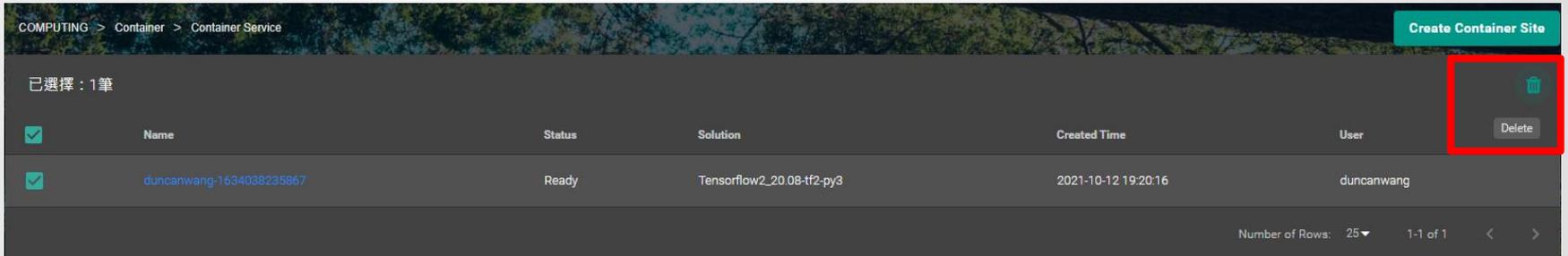4. Same as using SSH connection, the result of execution can be seen in terminal.
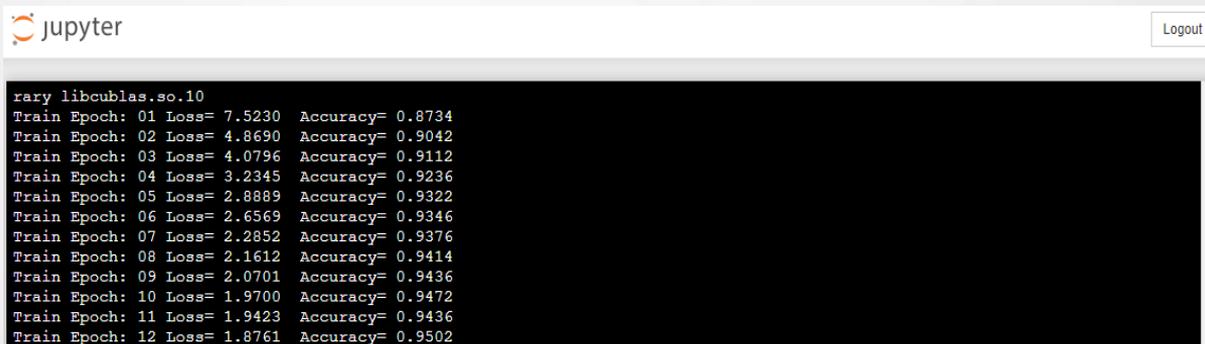
Container Service – deleting container site

- After finishing running the code, please delete the container site to release the resources(GPU).