IMEL7009 Project1 Training of a Fully-Connected Neural Network (20% of Final Mark)

Please train a **fully connected** neural network (Fig. 1) with **backpropagation** for **MNIST** (Fig. 2). You may use PyTorch, TensorFlow, or preferably just numpy. Please build **it with just numpy, other non-ML libs (i.e., no Keras, Tensorflow or Pytorch) or Matlab (no toolbox)**. Choose your network width and depth. Accuracy above 90% is good enough. Please document every step of your code. Your lab will be marked according to your level of **understanding and documentation** but **not the accuracy**.
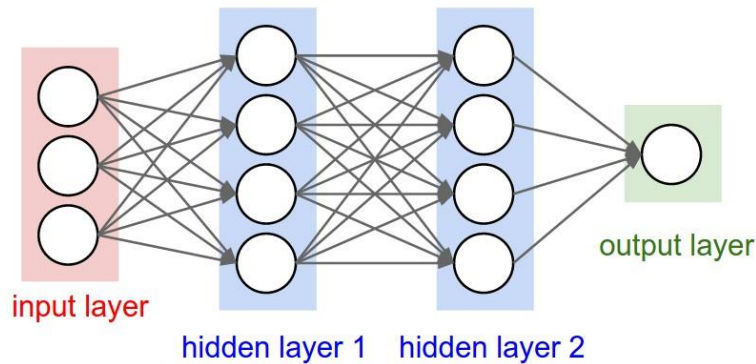

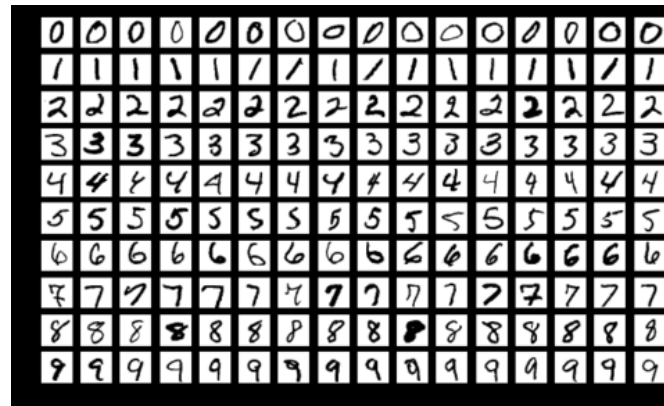Fig. 1. Fully connected Neural Network (source: CS231n, Stanford)

Fig. 2. MNIST handwriting recognition dataset. ([MNIST handwritten digit database, Yann LeCun, Corinna Cortes and Chris Burges](#))

You may contact your TA, Mr. Guo-Qiang Xin (Single) (yc27460@umac.mo), or instructor, Dr. Wei-Han Yu (hankyu@um.edu.mo), if you have questions. Please make appointments in advance with us through email. This project report will be due on (**15th Feburary**). The report can be in the form of **pdf or ipynb**. You can use **google colab, PyCharm IDE or MATLAB** for the project. Please submit your report on **UMmoodle** and use your **student ID as the file name** (e.g., "ya12345.ipynb").

You may search for open-source code on the internet (e.g., paperwithcode.com), but please **do not copy or let others copy your report**. Once found out (i.e., your report will be checked on Turnitin), both will be heavily punished.