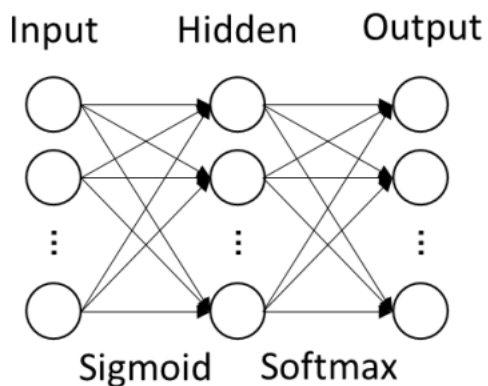


**Kennesaw State University**  
**CS 7357 Neural Nets and Deep Learning**  
**Project 3**

**Description**

In this homework, we are going to implement a neural network and convolutional neural network for the handwritten digit classification problem with the MNIST data. Please use the MNIST data that includes 100 images on each label of 0 – 9.

**You should implement a neural network (NN) and convolutional neural network (CNN), and compute accuracy using 5-fold CV to compare their performance. Note that NN and CNN must use the SAME data for fairly comparing the performance. You can design the network by yourself. But this is an example for NN:**



The network includes three layers: input, hidden, and output layer.

Input layer: 28\*28 nodes; the activation function to the hidden layer is "sigmoid"

Hidden layer: you can choose a number of nodes in the hidden layers; the activation function to the output layer is "softmax".

Output layer: The number of nodes in the output layer is 10, which is the number of classes in the MNIST data; The cost function is "Mean Squared Error".

You can implement the neural network using any deep learning frameworks (e.g., tensorflow)

## Submission

You have to submit the followings to D2L:

1. MS word file

- Describe what you have done for the homework assignment.
- Clarify network design (NN and CNN) and hyper-parameters.
- MUST include a Learning Curve (from an experiment)
- MUST include five accuracy and their average.

2. Python source code file(s)

- Must be well organized (comments, indentation, ...)
- You need to upload the “original python file (\*.py)” and also its “PDF” version.
  - o For the PDF file, you can just convert the source file to PDF. One way is to print the source file and save to “PDF”.

You have to submit the files SEPERATELY. DO NOT compress into a ZIP file.