

# CS489/689- HW 4

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In HW4, we are going to implement a neural network for the handwritten digit classification problem with the MNIST data. Please use the MNIST data for HW4 that includes 100 images on each label of 0 – 9.

Dataset: [http://mkang.faculty.unlv.edu/teaching/CS489\\_689/HW4/MNIST\\_HW4.csv](http://mkang.faculty.unlv.edu/teaching/CS489_689/HW4/MNIST_HW4.csv)

**You should implement a neural network (NN) and compute accuracy using 5-fold CV to compare their performance. You can design the network by yourself. You must clearly explain the architecture of your neural network. You can implement the neural network using any deep learning frameworks (e.g., keras, pytorch, tensorflow)**

## **Submission:**

You must submit the followings to WebCampus:

1. MS word file
  - Describe what you have done for the homework assignment.
  - Elucidate and justify your network design and hyper-parameters. (e.g., # of layers, # of nodes on each layer, choice of activation functions on each layer, cost function, learning rate, optimizer, and so on)
  - MUST include a Learning Curve (from an experiment)
  - MUST include five accuracy and their average.
2. Source code file(s)
  - Must be well organized (comments, indentation, ...)
  - You need to upload the “original python file (\*.py)” after changing to “\*.py.txt”. For example, “\*.py” to “\*.py.txt”

**You must submit the files SEPERATELY. DO NOT compress into a ZIP file. If you fail to provide all required information or files, you may be given zero score without grading.**

## **Rubric:**

- The architecture and setting of the neural network should be well explained and justified.
- Learning curve should show its convergence.
- 5-fold CV should be correctly implemented. Should include five accuracies and their average.

## **Deadline:**

You must submit HW3 by **Friday, April 10, 2020**. Late assignments will not be accepted.