**Texas Tech University**

**Department of Computer Science**

**Course:** Introduction to Artificial Intelligence **Group:** 1

**Instructor:** Dr. Juan Carlos Rojas **Email:** [Juan-Carlos.Rojas@ttu.edu](mailto:Juan-Carlos.Rojas@ttu.edu)

**Hours:** 8:00 – 12:00 (Saturdays) **Room:** 320

# Homework 7

Due Saturday, July 13 at 8:00am.

## Practice 1

* Create a 2-layer neural network for MNIST in Keras
  + Based on Mnist\_Keras\_2.py
* Try out the RMSprop optimizer on a network with
  + 200 neurons
  + 100 epochs
* Compare the results with other optimizers like Adam, AdaDelta & Adagad
  + You can use the results in the class presentation for reference
* Would you recommend using RMSprop for this problem?

## Practice 2

* Create a 3-layer network for MNIST
  + Based on Mnist\_Keras\_4.py
* Pick a number of total hidden nodes
  + For example, 300 total hidden nodes
* Split the nodes into Layer 1 and Layer 2 with different kinds of splits
  + 50/50
  + 60/40
  + Etc.
* Train with identical optimization methods, number of epochs and regularization
* Comment to the effect of different splits

## Practice 3

* Create a deep network for credit default classification with Dropout regularization
  + Based on CreditDefault\_Keras\_2.py
* Increase the total number of nodes beyond 300
  + Try something between 500 and 1000 nodes
* Adjust the dropout rate as necessary to obtain optimal results
  + You may need to increase the total number of epochs beyond 1000
* What is the best test ROC AUC score that you can get?
* Can you beat the Random Forest solution?