

Deep Learning – Hands-on Assignments

Lesson 2: Perceptron

Tutorial Reference: Build a classification model for the IRIS flower dataset using a Perceptron.

Q.1) **Cell 5:** Use first and second column of IRIS data for X. How does it change the classifier?
(Hint: Change the coordinates to make the graph visible.)

Q.2) **Cell 10:** Add a function for soft plus.

Q.3) **Cell 11:** Add code to plot the soft plus function and its derivative.

Q.4) **Cell 23:** Reduce the number of units of hidden layer 1 and 2. Does it reduce the accuracy?

Lesson 3 and 4: Artificial Neural Network

Tutorial Reference: Demonstrate building multi-layer ANN to classify MNIST digits.

Q.5) **Cell 13:** Instead of 25 versions of 7, display 9 versions of 5.

Q.6) **Cell 19:** Change the mini batch size from 100 to 200 and learning rate from 0.005 to 0.01 and run the notebook. Check the change in validation accuracy.

Lesson 6: Deep Neural Networks and Optimization

Tutorial Reference: Demonstrate various tuning and configuration options for neural networks.

Q.7) **Cell 4 and 5:** Try another activation function (Example: ReLU) to gradient saturation.

Q.8) **Cell 38:** Add one more hidden layer for MNIST classification. Does it improve accuracy? (**MNIST Classification**)

Q.9) **Cell 39:** How would you test accuracy on 50 test images only? (**MNIST Classification**)

Q.10) **Cell 47:** Change the code to run for 1 regularization only (without the base loss) (**Avoiding Overfitting Through Regularization**)

Lesson 6: Introduction to TensorFlow

Tutorial Reference: Predict if the consumers will buy houses, given their age and salary.

Q.11) **Cell 10:** Print TensorFlow reduce max.

Q.12) **Cell 10:** Create array with 36 data points.

Q.13) **Cell 31:** Print the number of unique classes in MNIST data.

Lesson 7: Convolutional Neural Networks

Tutorial Reference: Apply CNNs for MNIST image classification. Print training and test accuracy of the trained model.

Q.14) **Cell 30:** For Conv1 file change the kernel size to 5.

Q.15) **Cell 30:** For Conv2 file change the feature maps to 32.

Q.16) **Cell 30:** What happens if you change the activation function of the fully connected layers?

Q.17) **Cell 32:** Change batch size to 50.

Q.18) **Cell 34:** Change the dropout rate of the fully connected layer to 0.6.

Lesson 8: Recurrent Neural Networks

Tutorial Reference: Develop RNN to demonstrate sequence data processing

Q.19) **Cell 43:** Change the number of RNN neurons to 100 per cell and retrain the algorithm.

Q.20) **Cell 45:** Change the batch size from 150 to 50. Does it increase the accuracy?

Q.21) **Cell 45:** Tweak the code to measure the training time.