Deep Learning with MATLAB

Course Duration: 2 days

Course Objectives

Implement common deep learning workflows in MATLAB® using real-world image and sequence data. Dive into some of the ideas behind deep learning algorithms and standard network architectures.

Course Modules

==========

Module 01: Classifying Images with Convolutional Networks

Get an overview of the course. Perform image classification using pretrained networks. Use transfer learning to train customized classification networks.

Lessons:

- Course Overview
- Deep Learning Basics

==========

Module 02: Understanding Convolutional Neural Networks

Understand how information is passed between network layers and how different types of layers work.

Lessons:

- Understanding Neural Networks
- Convolutional Layers
- Viewing Filters
- Viewing the Activations of Different Layers
- Review - Understanding Convolutional Neural Networks

==========

Module 03: Creating and Training Networks

Train networks from scratch. Understand how training algorithms work. Set training options to monitor and control training.

Lessons:

- Training from Scratch
- Creating Network Architectures
- Understanding Network Training
- Monitoring Training Progress
- Validation
- Review - Creating and Training Networks

==========

Module 04: Improving Performance

Choose and implement modifications to training algorithm options and training data to improve network performance.

Lessons:

- Troubleshooting Methods
- Visualizing Network Predictions
- Augmented Datastores
- Training Options
- Experiment Manager
- Review - Improving Performance

==========

Module 05: Image Classification Project

Bring together image classification concepts that you have learned with a project.

Lessons:

- Project - Classify Fashion Images

==========

Module 06: Performing Regression

Create convolutional networks that can predict continuous numeric responses.

Lessons:

- What is Regression
- Transfer Learning for Regression
- Evaluating a Regression Network
- Review - Performing Regression

==========

Module 07: Using Deep Learning for Computer Vision

Train networks to locate and label specific objects within images.

Lessons:

- Computer Vision Applications
- Ground Truth
- YOLO Object Detectors
- Evaluating Object Detectors
- Review - Deep Learning for Computer Vision

==========

Module 08: Classifying Sequence Data with Recurrent Networks

Build and train networks to perform classification on ordered sequences of data, such as time series or sensor data.

Lessons:

- Course Example - Classify Flooding Level
- Managing Collections of Signal Data
- Long Short-Term Memory Networks
- Sequence Classification
- Improving LSTM Performance
- Review - Classifying Sequence Data with Recurrent Networks

==========

Module 09: Classifying Sequences of Output

Use recurrent networks to create sequences of predictions.

Lessons:

- Course Example - Classify Regions of Flooding Levels
- Labelling Regions of Interest
- Sequence-to-Sequence Classification
- Review - Classifying Sequences of Output

==========

Module 10: Sequence Classification Project

Bring together signal classification concepts that you have learned with a project.

Lessons:

- Project - Robot Navigation

==========
==========