Fundamentals of Deep Learning for Multiple Data Types

This workshop teaches you to apply deep learning techniques to a range of problems involving multiple data types through a series of hands-on exercises. You will work with widely-used deep learning tools, frameworks, and workflows by performing neural network training on a fully-configured GPU accelerated workstation in the cloud. After a quick introduction to deep learning, you will advance to building deep learning applications for image segmentation, sentence generation, and image and video captioning, while simultaneously learning relevant computer vision, neural network, and natural language processing concepts. At the end of the workshop, you will be able to assess a broad spectrum of problems where you can apply deep learning.

Duration	8.5 hours
Price	$10,000 for groups of up to 20 people (includes dedicated access during the course to a fully-configured GPU accelerated workstation in the cloud for each student)
Prerequisites	Successful completion of 'Fundamentals of Deep Learning for Computer Vision' DLI course or equivalent. Familiarity with basic python (functions and variables) and prior experience training neural networks is expected
Languages	English , Japanese
Tools, libraries, and frameworks	TensorFlow, TensorBoard

Learning Objectives:

At the conclusion of the workshop, you will have an understanding of the fundamentals of deep learning and be able to:

- Implement common deep learning workflows such as image segmentation and text generation
- Compare and contrast data types, workflows, and frameworks
- Combine deep learning powered computer vision and natural language processing to start solving sophisticated real-world problems that require multiple input data types

Why Deep Learning Institute Hands-on Training?

- Learn how to build deep learning and accelerated computing applications across a wide range of industry segments such as Autonomous Vehicles, Digital Content Creation, Finance, Game Development, and Healthcare
- Obtain guided hands-on experience using the most widely used, industry-standard software, tools, and frameworks
- Attain real world expertise through content designed in collaboration with industry leaders such as the Children's Hospital of Los Angeles, Mayo Clinic, and PwC
- Earn NVIDIA DLI Certification to prove your subject matter competency and support professional career growth
- Access courses anywhere, anytime with a fully configured GPU-accelerated workstation in the cloud

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Content Outline

	Components	Description
Introduction (45 mins)	• Content overview • Get started with deep learning	Introduction to deep learning, situations in which it is useful, key terminology, industry trends, and challenges.
Break (15 mins)		
Image Segmentation with TensorFlow (120 mins)	• Compare image segmentation to other computer vision problems • Experiment with TensorFlow tools • Implement effective metrics for assessing model performance	Hands-on exercise: Segment MRI images to measure parts of the heart using tools such as TensorBoard and the TensorFlow Python API.
Break (60 mins)		
Word Generation with TensorFlow (120 mins)	• Introduction to Natural Language Processing (NLP) and Recurrent Neural Networks (RNNs) • Create network inputs from text data • Test with new data • Iterate to improve performance	Hands-on exercise: Train a Recurrent Neural Network to understand both images and text, and to predict the next word of a sentence using the MSCOCO (Microsoft Common Objects in Context) dataset.
Break (15 mins)		
Image and Video Captioning (120 mins)	• Combine computer vision and natural language processing to describe scenes • Learn to harness the functionality of Convolutional Neural Networks (CNNs) and RNNs	Hands-on exercise: Train a model that generates a description of an image from raw pixel data by combining outputs of multiple networks (CNNs and RNNs) through concatenation and/or averaging.
Summary (15 mins)	• Summary of Key Learnings • Workshop Survey	Review of concepts and practical takeaways