

## Fundamentals of Deep Learning for Computer Vision

This workshop teaches you to apply deep learning techniques to a range of computer vision tasks through a series of hands-on exercises. You will work with widely-used deep learning tools, frameworks, and workflows to train and deploy neural network models on a fully-configured, GPU accelerated workstation in the cloud. After a quick introduction to deep learning, you will advance to building and deploying deep learning applications for image classification and object detection, followed by modifying your neural networks to improve their accuracy and performance, and finish by implementing the workflow that you have learned on a final project. At the end of the workshop, you will have access to additional resources to create new deep learning applications on your own.

Duration	8 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)
Certification	Upon successful completion of this workshop, you will receive NVIDIA DLI Certification to prove subject matter competency and support professional career growth
Prerequisites	Familiarity with basic programming fundamentals such as functions and variables
Languages	English, Japanese
Tools, libraries, and frameworks	Caffe, DIGITS

### 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 classification and object detection
- Experiment with data, training parameters, network structure, and other strategies to increase performance and capability of neural networks
- Integrate and deploy neural networks in your own applications to start solving sophisticated real-world problems

### 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
<b>Introduction</b> (45 mins)	<ul style="list-style-type: none"> <li>Course Overview</li> <li>Getting Started with deep learning</li> </ul>	Introduction to deep learning, situations in which it is useful, key terminology, industry trends, and challenges.
Break (15 mins)		
<b>Unlocking New Capabilities</b> (120 mins)	<ul style="list-style-type: none"> <li>Biological inspiration for Deep Neural Networks (DNNs)</li> <li>Training DNNs with Big Data</li> </ul>	Hands-on exercise: Training neural networks to perform image classification by harnessing the three main ingredients of deep learning: Deep Neural Networks, Big Data, and the GPU.
Break (45 mins)		
<b>Unlocking New Capabilities</b> (40 mins)	<ul style="list-style-type: none"> <li>Deploying DNN models</li> </ul>	Hands-on exercise: Deployment of trained neural networks from their training environment into real applications.
<b>Measuring and Improving Performance</b> (100 mins)	<ul style="list-style-type: none"> <li>Optimizing DNN Performance</li> <li>Incorporating Object Detection</li> </ul>	Hands-on exercise: neural network performance optimization and applying DNNs to object detection.
<b>Summary</b> (20 mins)	<ul style="list-style-type: none"> <li>Summary of Key Learnings</li> </ul>	Review of concepts and practical takeaways.
Break (15 mins)		
<b>Assessment</b> (60 mins)	<ul style="list-style-type: none"> <li>Assessment Project: Train and Deploy a Deep Neural Network</li> </ul>	Validate your learning by applying the deep learning application development workflow (load dataset, train and deploy model) to a new problem.
<b>Next Steps</b> (15 mins)	<ul style="list-style-type: none"> <li>Workshop Survey</li> <li>Setting up your own GPU enabled environment</li> <li>Additional project ideas</li> </ul>	Learn how to setup your GPU-enabled environment to begin work on your own projects. Get additional project ideas along with resources to get started with NVIDIA AMI on the cloud, nvidia-docker, and the NVIDIA DIGITS container.

This content is also available as a self-paced online option at <https://courses.nvidia.com/>