



Deep Learning for Autonomous Vehicles Perception

This workshop teaches you to apply deep learning techniques to design, train, and deploy deep neural networks for autonomous vehicles using the NVIDIA DRIVE development platform 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. The workshop starts with an introduction of Sensor Abstraction Layer (SAL) which is required for software to interface with the hardware sensors. After covering SAL and concepts on DRIVE PX, we teach you the steps required to do semantic segmentation on DRIVE PX and conclude by teaching techniques to leverage TensorRT, a high-performance neural network inference engine for production deployment of deep learning applications, to optimize, validate, and deploy trained neural network for inference in a self-driving car application.

Duration	8 hours
Price	\$10000 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	No
Prerequisites	Experience with CNNs
Languages	English, Japanese
Tools, Libraries, and Frameworks	TensorFlow, DIGITS, TensorRT

Learning Objectives

At the conclusion of the workshop, you will have an understanding of:

- Integrating sensor inputs using the DriveWorks software stack
- Training a semantic segmentation neural network
- Optimizing, validating, and deploying a trained neural network using TensorRT

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 content anywhere, anytime with a fully configured GPU-accelerated workstation in the cloud



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Content Outline

	Components	Description
Drive PX Overview (45 mins)	<ul style="list-style-type: none"> Overview of NVIDIA DriveWorks and DRIVE PX platform 	Learn about the capabilities of DRIVE Platform
Break (15 mins)		
Building Autonomous Vehicles with DRIVE PX (120 mins)	<ul style="list-style-type: none"> Interface with sensors using Sensor Abstraction Layer on DRIVE PX2 Use the tools and Labs to do perception on the vehicle Integrate DriveWorks Labs into custom code or applications 	Learn how to use DriveWorks into custom code or applications.
Break (60 mins)		
Training Semantic Segmentation for DRIVE PX (120 mins)	<ul style="list-style-type: none"> Convert an existing network into a fully convolutional network Explore different design choices to fit into the computation budget Train a semantic segmentation neural network 	Learn how to leverage computation capabilities of DRIVE PX2 to do semantic segmentation.
Break (15 mins)		
Deployment of Semantic Segmentation Network Using TensorRT (120 mins)	<ul style="list-style-type: none"> Profile inference performance using Drive PX2 Optimize using giexec or own executable Deep dive into INT8 calibration workflow 	Learn how to use TensorRT to optimize, validate, and deploy trained neural network for inference in a self-driving car application.
Closing Comments & Questions (15 mins)	<ul style="list-style-type: none"> Wrap-up with the potential next steps and Q&A 	Quick overview of the next -steps you could leverage to build and deploy your own applications and any Q&A