Deep Learning for Robotics

This workshop teaches you how to build a robot in simulation and deploy it to a physical version powered by NVIDIA Jetson™. You'll learn how to integrate computer vision into the Robot Operating System (ROS) so it can autonomously detect an object and move towards it. At the end of the workshop, you'll get access to additional resources for designing and deploying Jetson-based applications on your own.

Duration:	8 hours
Price:	Contact us for pricing. During the workshop, each participant will have dedicated access to a fully configured, GPU-accelerated workstation in the cloud.
Assessment type:	Code-based
Certificate:	Upon successful completion of the assessment, participants will receive an NVIDIA DLI certificate to recognize their subject matter competency and support professional career growth.
Prerequisites:	Experience with deep neural networks (specifically variations of convolutional neural networks); intermediate-level experience in Python; knowledge of Linux and C++ is helpful but not required.
Languages:	English
Tools, libraries, and frameworks:	ROS, GAZEBO simulator, NVIDIA DIGITS

Learning Objectives

At the conclusion of the workshop, you'll understand how to implement deep learning for robotics and be able to:

> Understand the general ROS paradigm of messages passing between nodes

> Work with the robotic development workflow by taking a hands-on approach to simulation, development, and deployment using a Gazebo simulator

> Integrate an object detection inference model, trained with DIGITS, into an ROS network to build autonomous behavior for a Jetson-based robot

Why Deep Learning Institute Hands-On Training?

> Learn to build deep learning and accelerated computing applications for industries such as autonomous vehicles, finance, game development, healthcare, robotics, and more.

> Obtain hands-on experience with the most widely used, industry-standard software, tools, and frameworks.

> Gain 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 an NVIDIA DLI certificate to demonstrate your subject matter competency and support career growth.

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

Workshop Outline

TOPIC	DESCRIPTION
Introduction (15 mins)	> Meet the instructor. > Create an account at **courses.nvidia.com/join**
Introduction to ROS Robot Control (120 mins)	> Get an overview of ROS and Gazebo. > Work with ROS nodes and topics on a cloud desktop to code and run robot movement in a Gazebo simulation.
Break (60 mins)	
Deploy to the Robot and ROS Integration of Image Recognition (120 mins)	> Deploy and test your code to the physical robot and test it in the real world. > Learn to integrate inference with ROS nodes and train with DIGITS. > Write code to parse classification messages and test with ROS bags on the desktop.
Break (15 mins)	
ROS Integration and Deployment of Object Detection (120 mins)	> Combine what you've learned about control and inference integration to build a ROS node that moves toward an object it identifies autonomously. > Deploy your code to the physical robot to autonomously find objects.
Final Review (15 mins)	> Review key learnings and wrap up questions. > Complete the assessment to earn a certificate. > Take the workshop survey.