

Title:

NVIDIA DLI: Synthetic Data Generation for Training Computer Vision Models

Abstract/Objectives:

How much data is enough? This is a common question when fine-tuning or training computer vision models. In cases where data collection is a limiting factor, we can use synthetic data! NVIDIA Omniverse Replicator streamlines synthetic data generation (SDG) using 3D assets into a single application, with the ability to modify the appearance and format of the data. This lab highlights one of the ways deep learning tools and Omniverse can be used together to streamline deep learning workloads.

This workshop uses a food manufacturing example to demonstrate the power of Omniverse Replicator SDG. In this course you will:

- Get hands-on experience writing and perfecting a Replicator script running in headless mode within Omniverse
- Run a short PyTorch script over your SDG output data to fine-tune a pretrained model for object detection
- Export your newly trained model to Triton Inference Server and test the results

Prerequisites:

- Intermediate understanding of Python (including classes, objects, and decorators):
 - Learn about this topic from the [Python.org tutorials](#)
- Basic understanding of Machine Learning and Deep Learning concepts and pipelines:
 - Learn about this topic from the [Deep Learning Demystified video](#)

Tools, Libraries, and Frameworks Used:

1. NVIDIA Omniverse Replicator (<https://developer.nvidia.com/omniverse/replicator>)
2. NVIDIA Triton Inference Server (<https://developer.nvidia.com/triton-inference-server>)
3. PyTorch (<https://pytorch.org/>)

This is a [DLI based workshop](#). We will have a DLI cloud allocation where users can enter in through their DLI account and access the lab and do the lab with the instructor in real time. All attendees will need an NVIDIA Developer account and DLI Account. Follow these steps to prepare for the workshop:

1. [Create an NVIDIA Developer Program account](#) prior to the day of the workshop. You will be asked for your name and email address. A confirmation email will be sent to your email address that you must respond to for the account to be created. Please test your account before the class and make sure it works.

If you already have an account, then you do not need to create a new one.

2. [Review the course data sheet](#) to be familiar with the prerequisites, learning objectives, and contents.