Enabling GPU Acceleration in DeepLTK Anomaly Detection Addon

Introduction

DeepLTK Anomaly Detection Addon has the following dependencies:

- DeepLTK - required.
- CuLab - optional.

The CuLab toolkit enables GPU acceleration, improving performance by up to 50×.
GPU acceleration is available starting from DeepLTK Anomaly Detection Addon v2.0.1 when used with DeepLTK v8.0.2.254 or newer and CuLab v4.1.1.77 or newer.

Users who do not require GPU acceleration can avoid optional dependencies and potential conflicts by disabling GPU acceleration, following the instructions provided in this document.

Enabling GPU acceleration

By default, **DeepLTK Anomaly Detection Addon** does not utilize GPU acceleration and does not depend on CuLab toolkit. To enable GPU support for both training and inference, the project needs to be modified to depend on CuLab, which requires CuLab to be installed on the development machine.

Note: Performing these actions will make the Anomaly Detection Addon dependent on the CuLab toolkit, requiring its installation.

To enable GPU acceleration for anomaly detection using CuLab, a Conditional Disable Symbol named “USE_CULAB” with a value of “TRUE” must be created. Below are detailed instructions on how to create this variable.

1. Install the latest version of CuLab.
2. After the installation, open project properties (LabVIEW → Project → Properties) as shown in Figure 1.

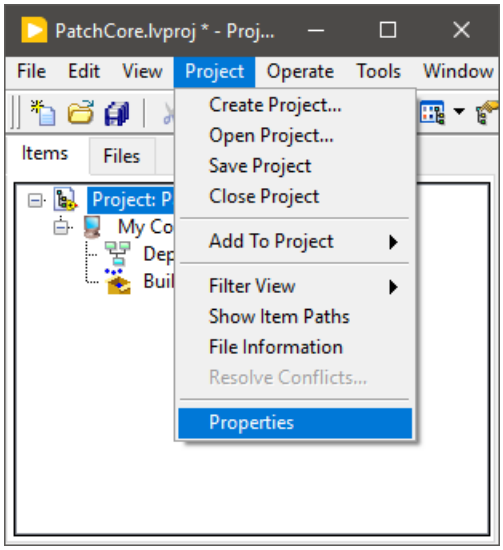

Figure 1

3. In the opened “Project Properties” window navigate to “Conditional Disable Symbols”, create a new symbol named “**USE_CULAB**”, set its value to “**TRUE**” (Figure 2) and add it to the symbols list.

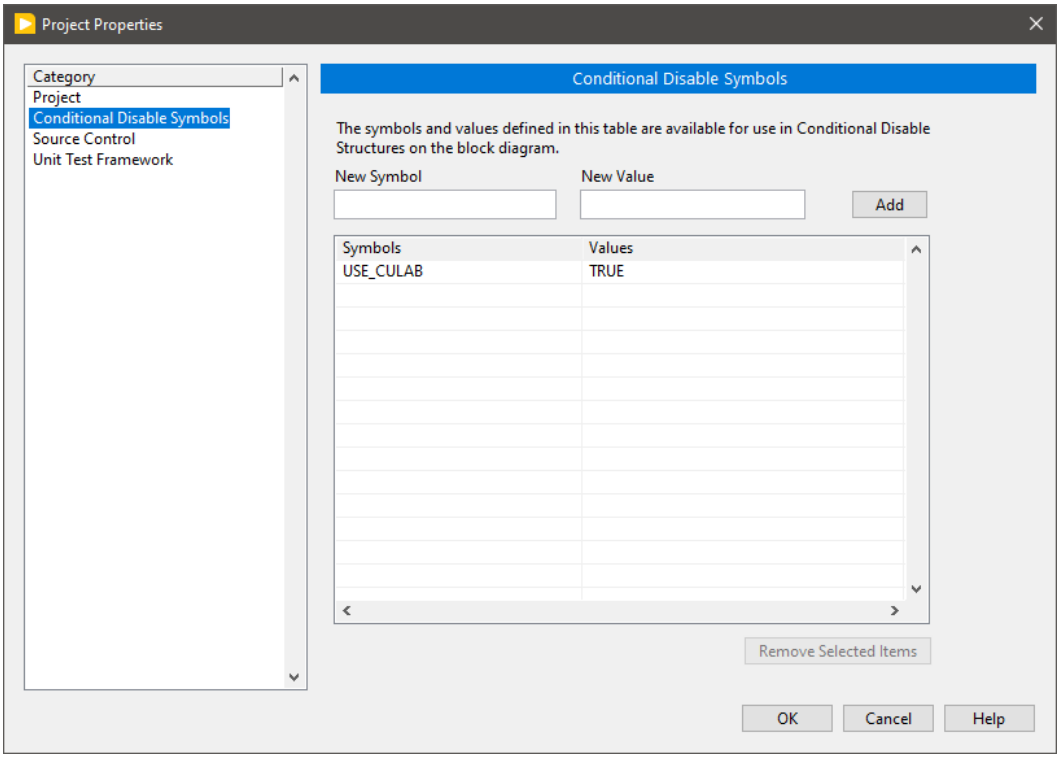

Figure 2

4. Once CuLab is installed and the project is set up, users can switch between CPU and GPU mode execution modes with help of API interfaces of “NNPC_Init(Train).vi” and “NNPC_Init(Interference).vi” as shown in figures below.

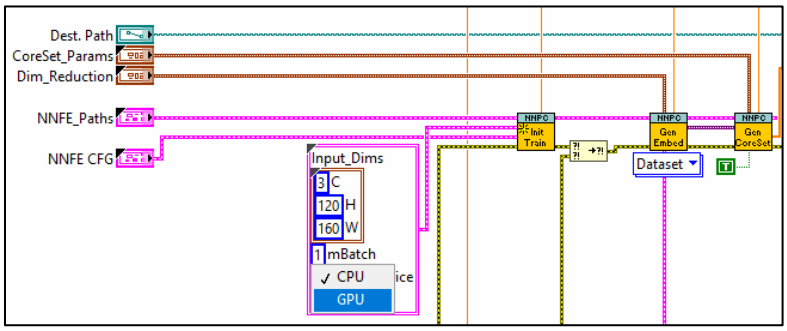

Figure 3

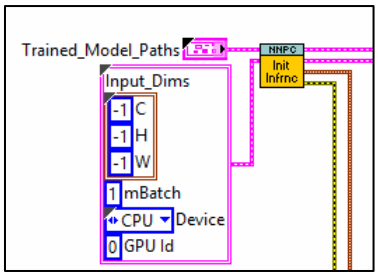

Figure 4

Disabling GPU acceleration

To remove dependency on the CuLab toolkit and disable GPU acceleration, “USE_CULAB” Conditional Disable Symbol should be changed to values other than “TRUE” (e.g. “FALSE”) or removed from the symbols list.

Removing DeepLTK’s dependency from CUDA drivers

Note: The instructions below apply only to DeepLTK version 8.0.3.258 and above.

On some machines without NVIDIA GPUs and drivers, an error may occur when loading CUDA DLLs in a LabVIEW project. To prevent this error, DeepLTK’s dependency on CUDA drivers should be removed by adding a new Conditional Disable Symbol named "NO_CUDA" with a value of "TRUE", as shown in Figure 5.

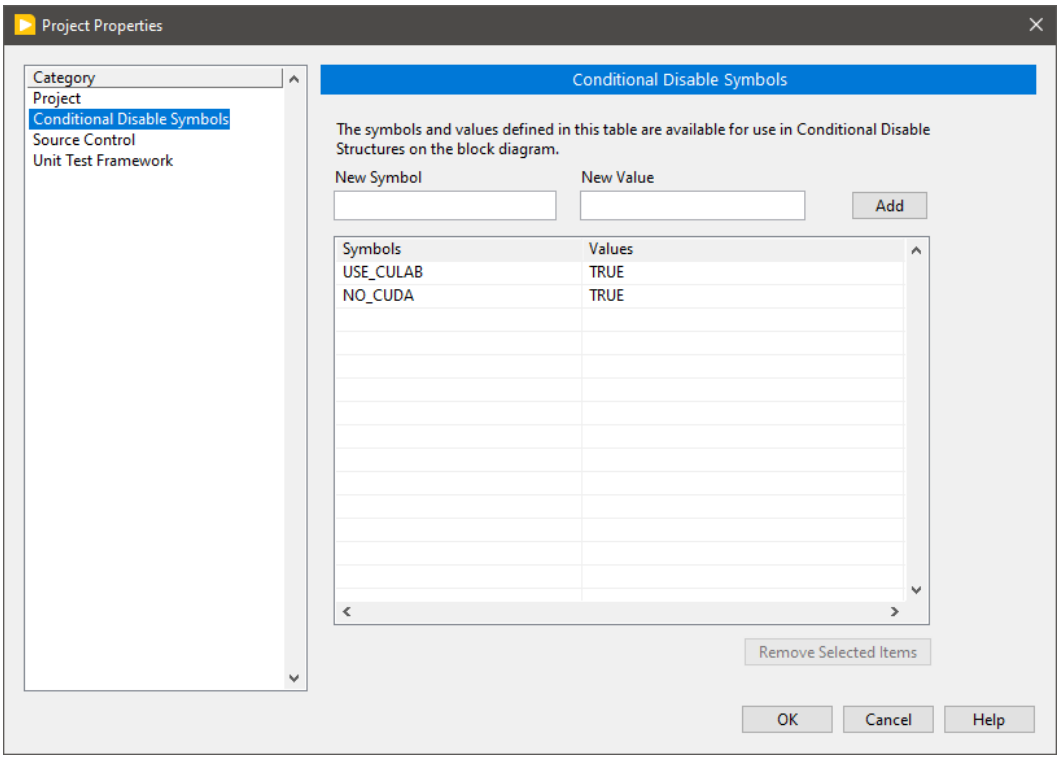

Figure 5

Below is a table summarizing the values of Conditional Disable Symbols for various scenarios.

Scenario	Symbol Names		Toolkit	Version
	USE_CULAB	NO_CUDA		
With GPU acceleration	TRUE	FALSE (or removed)	CuLab DeepLTK	≥ v4.1.1.77 ≥ v8.0.2.254
Without GPU acceleration	FALSE (or removed)	TRUE	DeepLTK	≥ v8.0.3.258