Report on CUDA Libraries

NVIDIA® CUDA-X, built on top of NVIDIA CUDA®, is a collection of libraries, tools, and technologies that deliver dramatically higher performance—compared to CPU-only alternatives— across multiple application domains, from artificial intelligence (AI) to high performance computing (HPC).

Components

Math Libraries – for compute-intensive applications

cuBLAS – Basic Linear algebra(BLAS) library

cuFFT – For Fast Fourier Transforms

CUDA Math Library – Standard Mathematical Function Library

cuRAND – Random Number Generation

cuSOLVER – Dense and Sparse direct solvers

cuSPARSE – Basic Linear Algebra library for sparse matrices

cuTENSOR – Tensor Linear Algebra library

AmgX – Linear Solvers for Simulations and implicit unstructured methods

Parallel Algorithm Libraries – Contains highly efficient parallel algorithms for several operations in C++ for use with graphs

Thrust – Library of C++ Parallel Algorithms and data structures

Image and Video Libraries – For Image and Video decoding, encoding, and processing

nvJPEG – High performance GPU-accelerated library for JPEG decoding

NVIDIA Performance Primitives – Provides GPU-accelerated image, video and signal processing functions

NVIDIA Video Codec SDK – A complete set of APIs, samples and documentation for hardware-accelerated video encode and decode on Windows and Linux

NVIDIA Optical Flow SDK – Exposes the latest hardware capability of NVIDIA Turing GPUs dedicated to computing the relative motion of pixels between images

Communication Libraries

NVSHMEM – OpenSHMEM standard for GPU memor with extensions for improved performance on GPUs

NCCL – Open source library for fast multi-GPU, multi node communications that maximise bandwith while maintaining low latency

Deep Learning Libraries – for Deep Learning applications

NVIDIA cuDNN – GPU accelerated library of primitives for deep neural networks

NVIDIA TensorRT – High performance deep learning inference optimizer and runtime for production deployment

NVIDIA Jarvis – Platform for developing engaging and contextual AI-powered conversation apps

NVIDIA DeepStream SDK – Real-time streaming analytics toolkit for AI-based video understanding and multi-sensor processing

NVIDIA DALI – Portable open-source library for decoding and augmenting images and videos to accelerate deep learning applications

Partner Libraries

OpenCV – Open source library for computer vision, image processing and machine learning, now suppoting real-time operations

FFmpeg – Open-source multimedia framework with a library of plugins for audio and video processing

ArrayFire – Open source library for matrix, signal and image processing

MAGMA – Linear algebra routines for heterogenous architectures by Magma

IMSL Fortran Numerical Library – Open source fortran library with functions for math, signal and image processing, statistics by RogueWave

Gunrock – Library for graph-processing

CHOLMOD – GPU-accelerated functions for sparse direct solvers included in the SuitSparse linear algebra package

Triton Ocean SDK – Real-time visual simulation of ocean, water bodies in games, simulation, and training applications by Triton

CUVIlib – Primitives for accelerating imaging applications from medical, industrial and defense domains