

DL using MATLAB

ABSTRACT:

Deep Learning for Computer Vision: Hands-on MATLAB Workshop

Designing and deploying deep learning based computer vision applications to embedded CPU and GPU platforms is challenging because of resource constraints inherent in embedded devices. A MATLAB® based workflow facilitates the design of these applications, and automatically generated C or CUDA® code can be deployed on boards like the Jetson TX2 and DRIVE™ PX to achieve very fast inference. The workshop illustrates how MATLAB supports all major phases of this workflow. Starting with algorithm design, the algorithm may employ deep neural networks augmented with traditional computer vision techniques and can be tested and verified within MATLAB. Next, these networks are trained using GPU and parallel computing support for MATLAB either on the desktop, cluster, or the cloud. Finally, GPU Coder™ generates portable and optimized C/C++ and/or CUDA® code from the MATLAB algorithm, which is then cross-compiled and deployed to ARM/Intel CPUs and NVIDIA Tegra® boards.

Agenda:

9:00 AM – 11:00 AM

Introduction to Deep Learning for Computer Vision Applications Using MATLAB

Hands-on exercises:

Use a pretrained network for image classification
Build a deep learning network from scratch
Perform transfer learning

BREAK

11:15 PM – 1:00 PM

Addressing Challenges in Deep Learning Workflows Using MATLAB

Hands-on exercises:

- Accelerating the labelling process using automation algorithms

- Understanding network behaviour using visualizations

The presenters will also discuss the following topics during the workshop:

- Labelling large amount of images
- Hyperparameter tuning of deep neural networks
- Scaling up training to GPUs, multi-GPUs and clusters
- Deployment workflows for desktop, web, and cloud
- Deployment workflows using automatic code generation for embedded platforms (NVIDIA GPU, Intel CPU, ARM CPU)

PRE-REQUISITES FOR HANDS-ON WORKSHOP:

Laptops with MATLAB (version R2017b or later) installed. Preferably R2018b (latest).
The list of the toolboxes needed for the workshop includes:

MATLAB® and a full set of products for deep learning: Neural Network Toolbox™, Statistics and Machine Learning Toolbox™, Parallel Computing Toolbox™, Image Processing Toolbox™, Computer Vision System Toolbox™, Image Acquisition Toolbox™, and Signal Processing Toolbox™.)

Once the MATLAB is up and running Download and Install pre-trained network Alexnet (download)

EXPERT PROFILE:

Dr. Rishu Gupta
Senior Application Engineer, MathWorks India

Rishu Gupta is a senior application engineer at Mathworks. He primarily focuses on image processing, computer vision and deep learning applications. Rishu has an experience of over 9 years working on applications related to visual contents. He previously worked as a scientist at LG soft India, research and development unit. He has published and reviewed papers in

multiple peer-reviewed conferences and journals. Rishu holds bachelors degree in electronics and communication engineering from BIET Jhansi. Masters in visual contents from Dongseo University, South Korea, working on the application of computer vision. PhD in electrical engineering from University Technology Petronas, Malaysia with focus on Biomedical Image Processing using ultrasound images.”