Fundamentals of Deep Learning for Computer Vision

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The NVIDIA Deep Learning Institute (DLI) and Data Science and Engineering Laboratory (D-Lab), School of Information Technology, King Mongkut's University of Technology Thonburi (KMUTT) invite you to attend a hands-on deep learning workshop on Monday, June 29, 2020 from 9:00 am – 5:00 pm on Zoom, exclusively for verifiable academic students, staff, and researchers. This workshop teaches deep learning techniques for a range of computer vision tasks through a series of hands-on exercises. You will work with widely-used deep learning tools, frameworks, and workflows to train and deploy neural network models on a fully-configured, GPU-accelerated workstation in the cloud. After a quick introduction to deep learning, you will advance to: building and deploying deep learning applications for image classification and object detection, modifying your neural networks to improve their accuracy and performance, and implementing the workflow you have learned on a final project. At the end of the workshop, you will have access to additional resources to create new deep learning applications on your own.

Bio: Dr. Jonathan H. Chan is an Associate Professor of Computer Science at the School of Information Technology (SIT), King Mongkut's University of Technology Thonburi (KMUTT), Thailand. Dr. Chan holds a B.A.Sc., M.A.Sc., and Ph.D. degree from the University of Toronto. He is the Section Editor of *Heliyon Computer Science* (Cell Press – an imprint of Elsevier), an Action Editor of *Neural Networks* (Elsevier), and a member of the editorial boards of several international publications. Dr. Chan is the VP of Education and a Governing Board member of the Asia Pacific Neural Network Society (APNNS). In addition, he is a founding member and the current Chair of the IEEE-CIS Thailand Chapter. Dr. Chan is a senior member of IEEE, ACM, and INNS, and a member of the Professional Engineers of Ontario (PEO). Furthermore, he holds an NVIDIA Deep Learning Institute (DLI) University Ambassadorship and is a certified DLI instructor. His research interests include intelligent systems, biomedical informatics, and data science and machine learning.

Duration:	6 hours+
Assessment type:	Coding
Certification:	Upon successful completion of the workshop, participants will receive NVIDIA DLI Certification to recognize subject matter competency
Prerequisites:	Familiarity with programming fundamentals such as functions and variables

Learning Objectives

At the conclusion of the workshop, you will have an understanding of the fundamentals of deep learning and be able to:

- Implement common deep learning workflows, such as image classification and object detection.
- Experiment with data, training parameters, network structure, and other strategies to increase performance and capability of neural networks.
- Integrate and deploy neural networks in your own applications to start solving sophisticated real-world problems.

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Workshop Setup Instructions:

1. Create an NVIDIA Developer account at http://courses.nvidia.com/join.
2. Make sure that WebSockets works for you:
   - Test your laptop at http://websocketstest.com
   - Under ENVIRONMENT, confirm that "WebSockets" is checked yes.
   - Under WEBSOCKETS (PORT 80), confirm that "Data Receive," "Send," and "Echo Test" are checked yes.
3. If there are issues with WebSockets, try updating your browser. We recommend Chrome, Firefox, or Safari for an optimal performance.
4. Once onsite, visit http://courses.nvidia.com/dli-event and enter the event code provided by the instructor.

	Components	Description
Introduction (45 mins)	• Course overview • Getting started with deep learning	Introduction to deep learning, situations in which it is useful, key terminology, industry trends, and challenges
Break (15 mins)		
Unlocking New Capabilities (120 mins)	• Biological inspiration for deep neural networks (DNNs) • Training DNNs with big data	Hands-on exercise: training neural networks to perform image classification by harnessing the three main ingredients of deep learning: deep neural networks, big data, and the GPU
Break (45 mins)		
Unlocking New Capabilities (40 mins)	• Deploying DNN models	Hands-on exercise: deployment of trained neural networks from their training environment into real applications
Measuring and Improving Performance (100 mins)	• Optimizing DNN performance • Incorporating object detection	Hands-on exercise: neural network performance optimization and applying DNNs to object detection
Summary (20 mins)	• Summary of key learnings	Review of concepts and practical takeaways
Break (15 mins)		
Assessment (60 mins)	• Assessment project: train and deploy a deep neural network	Validate learnings by applying the deep learning application development workflow (load dataset, train and deploy model) to a new problem
Next Steps (15 mins)	• Workshop survey • Setting up your own GPU-enabled environment • Additional project ideas	Learn how to setup your GPU-enabled environment to begin work on your own projects. Explore additional project ideas along with resources to get started with NVIDIA RAPIDS the cloud, nvidia-docker, and so on.