

*IEEE HK Section Lecture Series
on Continuing Education*

4-Days IEEE joint Tutorial/Workshop on Deep Learning (Part1):

*2-Days **Tutorial** on Deep Learning*

Date: Friday-Saturday, 5-6 March 2021 (Lecture: Hybrid (choice by Attendee), Lab (Optional): Onsite)

Time: Lecture: 9.00-5.00 for both days, Lab (optional): 6.30-9.30, any two evenings on 5,6, 8 or 9 March

Organized and Sponsored by: *IEEE Hong Kong Section, IEEE Hong Kong Life-Member Affinity Group, Caritas Institute of Higher Education, UGC/IDS(R)/11/19, Hong Kong Polytechnic University*

Co-Sponsors and Technical Co-Sponsors: *Asia Pacific Association on Signal and Information Processing (APSIPA), TeleEye Founders' Charity Foundation Ltd.*

Organizers: *Prof. H. Anthony Chan (FIEEE) and Dr. Paulina Chan (Chair, IEEE Hong Kong Section)*

Chief Speaker: *Prof. Wan-Chi Siu, PhD, DIC, Life-FIEEE*

Speakers: *Dr. Tina Xueting Liu, Dr. Yingchao Zhao, Dr. Chengze Li and Dr. Zhisong Liu*

Hong Kong is aspiring to become one of the smart cities in the world. An indispensable part of this development relies on the smart use of computer and information technology (CIT). In the recent years, deep learning in machine learning has achieved drastic achievements for segmentation, pattern recognition, classification, forecasting, ... which are extremely useful for applications such as robotic, imaging, video analytic, surveillance, autonomous vehicle, medical diagnosis, DNA identification, big data, business analysis, finance forecasting, etc. This progress relies on the great advancement of computer architecture and graphic cards which allow heavy learning and the development of various deep learning architectures and system structures. This is a short course on **Continuing Education**, for which we assume the attendees have some basic background knowledge of computer and linear systems. Upon completion of this course, **attendees should be able to understand the basic theory behind and enhance their capability on the baseline structure, some models and the training procedure of deep learning, for applications such as classification, de-noising and others.** Contents of this tutorial include the following.

1. Learning Approach with Black Box Learning tools
2. Review of Neural Networks (NN), and Back Propagation Model, etc., with numerical examples
3. Deep learning with Autoencoder Network
4. CNN: Convolutional Neural Network
5. LeNet and other successful CNN networks
6. AlexNet for object classification
7. Residual Network (ResNet)
8. GAN (Generative Adversarial Network) against Conventional Discriminative model
9. RCNN and YOLO networks (if time allowed)
10. **Experiment(s) - Optional** (to be arranged outside the lecture sessions)

Quota: 50

For limited quota, Early Registration is recommended.

Click here for Registration:

<https://cis.cihe.edu.hk/workshop.html#01>

Optional Labs: A set of graded experimental exercises is available, which (i) starts with input and output formats of a Deep Learning model as a Black Box Learning Tool, and allows attendees to produce results, demonstrations and plotting, (ii) guides attendees going through the training procedure of deep learning for object classifications, (iii) shows details of image classification and denoising with deep learning, etc. **Those who finish these experiments should be able to (i) start or enhance their research or (ii) perform their engineering work making use of basic Deep Learning techniques.**

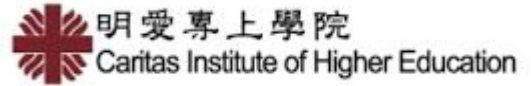
Course Fee: HK\$1000 (this is a reduced fee, and the course is **heavily subsidized by the sponsors**)

HK\$ 800 for Sponsor organizations, including IEEE and/or APSIPA members

Registration: <https://cis.cihe.edu.hk/workshop.html#01>

Coordinator: Ms Daisy Kwok, dkwok@cihe.edu.hk, CIHE

Click here for free
Part II, IEEE Workshop on Deep
Learning.
<https://cis.cihe.edu.hk/workshop.html#02>



**IEEE HK Section Lecture Series on
Continuing Education**

2-Days *Tutorial* on Deep Learning

Date: Friday-Saturday, 5-6 March 2021 (Lecture: Hybrid (choice by Attendee), Lab (Optional): Onsite)

Time: Lecture: 9.00-5.00 for both days, Lab (optional): 6.30-9.30, any two evenings on 5,6, 8 or 9 March

Organized and Sponsored by: IEEE Hong Kong Section, IEEE Hong Kong Life-Member Affinity Group, Caritas Institute of Higher Education, UGC/IDS(R)/11/19, Hong Kong Polytechnic University

Co-Sponsors and Technical Co-Sponsors: Asia Pacific Association on Signal and Information Processing (APSIPA), TeleEye Founders' Charity Foundation Ltd.

Organizers: Prof. H. Anthony Chan (FIEEE) and Dr. Paulina Chan (IEEE Hong Kong Section)

Chief Speaker: Prof. Wan-Chi Siu, PhD, DIC, Life-FIEEE

Speakers: Dr. Tina Xueting Liu, Dr. Yingchao Zhao, Dr. Chengze Li and Dr. Zhisong Liu

Friday 5 March 2021

a.m. 9.00-12.00

Opening Remark

(3 min, Prof. H. Anthony Chan)

1. General Presentation leading to Deep Learning
2. Back Propagation on Neural Network

(2 hr, Prof. W.C. Siu)
(1 hr, Dr. Yingchao Zhao)

p.m. 2.00-5.00

3. Non-Linear function and Deep Learning Layers
4. UNet and Its application to Segmentation (or De-noising)
5. The ReNet

(1 hr, Prof. W.C. Siu)
(1 hr, Dr. Tina Liu)
(1 hr, Prof. W.C. Siu)

Saturday 6 February 2021

a.m. 9.00-12.00

6. GAN (Generative Adversarial Network)
7. The AlexNet and Realization Technologies

(2 hr, Prof. W.C. Siu)
(1 hr, Dr. Zhisong Liu)

p.m. 2.00-5.00

8. RCNN and/or YOLO (if time allowed, or simplified version)
9. Pytouch Realization for LeNet/AlexNet/GoogleNet)

(2 hr, Prof. W.C. Siu)
(1 hr, Dr. Chengze Li)

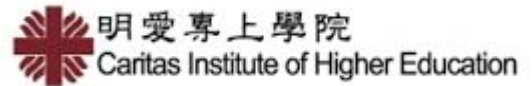
Lecturer in charge of Optional Laboratory Sessions: Dr. Chengze Li & Dr. Zhisong Liu

Lab 1: Simplified Procedure for Handwritten Digit Recognition via Convolutional Neural Network (CNN)

Lab 2: Object/Digit Classification and Re-Training using AlexNet (updated Lab2M ver.2)

Lab 3: Using U-Net for Image Denoising





*IEEE HK Section Lecture Series on
Continuing Education*

2-Days *Tutorial on Deep Learning - Speakers:*

Prof. H. Anthony Chan, PhD, FIEEE, is now the Dean of School of Computing and Information, Caritas Institute of Higher Education (CIHE). He had conducted basic science research as post-doctorate at Univ. of Maryland. In 1986-2001, he conducted industry research at the former AT&T Bell Labs where he had served as the lead AT&T delegate at 3GPP network standards. He was professor at Univ. of Cape Town during 2003-07 and then joined Huawei Technologies in USA to conduct standards and research in 5G Wireless and IETF standards. Prof. Chan has authored/co-authored 30 USA and international patents, 250 journal/conference papers, a book and 5 book chapters; edited/authored/contributed to 4 network standards documents at IEEE and IETF. He had been a distinguished speaker of IEEE ComSoc, IEEE CMPT Society, and IEEE Reliability Society, respectively, and has presented 20 keynotes/invited talks and 40 conference tutorials.

Prof. Wan-Chi Siu, PhD, DIC, Life-FIEEE, is Emeritus Professor of HK PolyU and Research Professor of CIHE. He was Chair Professor, HoD(EIE) and Dean of Engineering Faculty of The Hong Kong Polytechnic University. He was also convenor of the First Engineering/IT Panel of the Research Assessment Exercise (RAE, 1992/3) for all universities in Hong Kong, and was Vice President, Chair of Conference Board and core member of Board of Governors of the IEEE SP Society (2012-2014). He is Life-Fellow of IEEE, CEng, Fellow of IET, and Immediate-Past President of APSIPA (2019-2020, Asia Pacific Signal and Information Processing Association), and has been Guest Editor/Subject Editor/AE for IEEE Transactions on CAS, IP, CSVT, and Electronics Letters, published over 500 research papers and organized IEEE society-sponsored flagship conferences as TPC Chair (ISCAS1997) and General Chair (ICASSP2003 and ICIP2010). Prof. Siu is a very popular lecturing staff member within the University, while outside the University he has been a **keynote speaker** of over 10 international/national conferences in the recent 10 years. He received many awards, such as Distinguished Presenter Award, the Best Teacher Award, the Best Faculty Researcher Award (two times) and the IEEE Third Millennium Medal.

Dr. Yingchao Zhao, PhD, MIEEE, got the PhD degree from the department of computer science and technology, Tsinghua University in 2009. Then she came to Hong Kong and worked as a research fellow in City University of Hong Kong and Hong Kong University of Science and Technology. In 2011, she joined the Caritas Institute of Higher Education and began her teaching life in the department of computer science. In 2020, she was promoted to Associate professor. Her research focuses on theoretical computer science, algorithm design and analysis in embedded systems and networks. She has one on-going and two completed FDS projects funded by HK RGC.

Dr. Tina Liu, PhD, received the Ph.D. degree from The Chinese University of Hong Kong in 2014. She then worked as a postdoctoral fellow in the Department of Computer Science and Engineering at the Chinese University of Hong Kong from 2014 to 2018. Dr. Liu is now an Assistant Professor in the School of Computing and Information Sciences at Caritas Institute of Higher Education. Her research interests include computer graphics, computer vision, machine learning/deep learning, non-photorealistic rendering, and computational manga and anime.

Dr. Zhisong Liu, PhD, MIEEE, received the Ph.D. degree in electronic engineering in 2020 from The Hong Kong Polytechnic University, and has published over 15 papers relating to Deep Learning and Super-resolution Imaging to journals like IEEE Transactions on Image Processing and IEEE Transactions on Circuits and Systems for Video Technology, and international conferences such as ICASSP, ICIP, CVPR and ECCV. He is now a Research Fellow of the Caritas Institute of Higher Education. His research interests include deep learning technologies, imaging and video signal processing.

Dr. Chengze Li, PhD is an Assistant Professor in the School of Computing and Information Sciences at Caritas Institute of Higher Education and received Ph.D. degree The Chinese University of Hong Kong in 2020. In recent years, his research focuses on the understanding and processing of 2D non-photorealistic contents with deep learning techniques. He published several papers on the processing of ACG (animation, comics, games) contents and some of them are accepted by top venues such as ACM SIGGRAPH. His research interests include computer vision and graphics topics, such as computational photography, deep image semantic understanding, visualization, and human-computer interaction.



