RGC Ref. No.:
UGC/IDS(R)11/19
(please insert ref. above)

RESEARCH GRANTS COUNCIL
COMPETITIVE RESEARCH FUNDING SCHEMES FOR
THE LOCAL SELF-FINANCING DEGREE SECTOR

INSTITUTIONAL DEVELOPMENT SCHEME (IDS)
RESEARCH INFRASTRUCTURE GRANT

Completion Report

(for completed projects only)

Submission Deadlines:
1. *Auditor's report with unspent balance, if any: within **six** months of the approved project completion date.*
2. *Completion report: within **12** months of the approved project completion date.*

Important Note:
In completing the report, please use the following format:

Page limit:	Items 1 to 5 and Summary of Completion Report: no page limit Items 6 to 9: maximum **20 A4 pages** (excluding any appendices and attachments)
Font:	Times New Roman
Font Size:	**Not smaller** than Point 12
Margin:	Two centimeters margin all around
Spacing:	Single-line spacing

1. Project Title

Establishment of Distributed Artificial Intelligence Laboratory for Interdisciplinary Research

2. Investigator(s) and Academic Department(s) / Unit(s) Involved#

Project Team	Name / Post	Department / Unit	Average Number of Hours Per Week Spent on this Project
Project holder* (i.e. Head of Institution)	Dr MAK Kin-wah/ Former President, Prof. LO Tit-wing /Acting President	Saint Francis University	1
Team leader	Prof. CHAN Hing Hung Anthony/Professor cum Dean	School of Computing and Information Sciences/Saint Francis University	8
Team member (playing	Prof. SIU Wan Chi / Research Professor	School of Computing and	8

role of co-team leader)		Information Sciences/Saint Francis University	
	Dr. LIU Xueting Tina/ Assistant Professor	School of Computing and Information Sciences/Saint Francis University	4
	Dr. AU Kwok Cheong Ricky/ Professor	School of Health Sciences/Saint Francis University	4
	Dr. LEE Chi Wai Patrick/ Assistant Professor	Felizberta Lo Padilla Tong School of Social Sciences /Saint Francis University	4
	Dr. CHOW Kin Man Charles/ Assistant Professor	School of Humanities and Languages/Caritas Institute of Saint Francis University	4
	Dr. YANG Yih-Sheng/ Retired	N/A	2

[#] *Please state the **key** staff and department/unit involved in the project. Please add row(s) as necessary. Please also highlight the approved changes in project team composition and quote the date of the RGC approval for such changes.*

[*] *Refer to "Applicant" for 2015/16 exercise and "Project holder" for 2017/18 exercise onwards.*

3. Project Duration

	Original	**Revised**	**Date of RGC / Institution Approval** *(must be quoted)*
Project Start Date	01/01/2020	N/A	N/A
Project Completion Date	31/12/2022	30/06/2023	06/10/2022
Duration *(in month)*	36	42	06/10/2022
Deadline for Submission of Completion Report	31/12/2023	30/06/2024	06/10/2022

4. Project Objectives

Summary of objectives addressed / achieved:

Objectives[*]	**Percentage Achieved**	**Remarks**[**]
1. The School of	100%	

Objectives*	Percentage Achieved	Remarks**
Computing and Information Sciences will take the lead in equipping an AI laboratory with the needed basic hardware and software license and provide other schools and departments with the basic know how in conducting AI research.		Now the AI Lab has **12** desktop computers with GPU, and **10** RA's have **15** computers with GPU cards. It also has seven "MSI 15.6"" Stealth Laptop and one server
Milestone in 3rd year: (item # 6) steering group meetings to review projects and output, 100% complete.	100%	We have regularly reviewed this project as in previous year. Please refer to Section 6.1 on the accomplishments of this report.
Milestone in 1st year: (1) Acquire AI facility to construct basic laboratory, 100% complete.	100%	AI computing system for deep learning is purchased early 2021 instead of 2020 because many staff were working from home owing to pandemic in 2020 and a better model will become available in 2021. Implementation plan had accordingly updated. (a) 3 deep learning machines were purchased during 2021 as more staff are conducting AI research. 10 Potable AI machines were acquired in 2021 to enable staff to quickly conduct preliminary AI experiments and to run demo. This is especially helpful during the pandemic. (c) In 2021, more powerful GPU replaced the less powerful ones acquired in 2020. More powerful GPUs were added in 2022 as the research staff are building up.
Milestone in 2nd year: (1) Upscale AI facility, 100% complete.	100%	An AI server with multiple GPU was purchased, and more AI laptop and AI machines were installed in 2022.
2. This laboratory will produce some core modules which can cater for diverse needs in different AI research. Multiple powerful AI machines can meet the needs of intensive operations in deep learning. More intensive operations with big data	100%	**List of Modules developed** which are in the form of Laboratory Exercise and allow students/learners to grasp the key practice of Deep Learning quickly. **Lab 1: Simplified Procedure for Handwritten Digit Recognition via Convolutional Neural Network (CNN)** (start-up lab. exercise) pp.1-49 Module Leader: Prof. Wan-Chi Siu Module Contributor: Dr. Zhi-Song Liu, Other

Objectives*	Percentage Achieved	Remarks**
will be performed at even more powerful servers. Still even more extensive operations will be performed by renting the services of suitable commercial AI platform.		Contributors: Chu-Tak Li, Wai-Lam Hui Cum Dean (SCIS): Prof. Anthony Chan, **Lab 2: Introduction to CNN Training for Digit Recognition** (for training and classification), **(v.1 pp.1-32, v2: pp.1-52)** Module Leader: Prof. Wan-Chi Siu Module Contributor: Mr. Chu Tak Li, Other Contributors: Zhi Song Liu Cum Dean (SCIS): Prof. Anthony Chan **Lab 3: Sample Use of CNN via Image Denoising** (for image to image processing) **pp.1-19** Module Leader: Prof. Wan-Chi Siu Module Contributor: Mr. Li-Wen Wang, Other Contributors: Chu-Tak Li, Zhi Song Liu and Wai-Lam Hui Cum Dean (SCIS): Prof. Anthony Chan **Lab 4: Application of Deep Learning: Image Super-Resolution , pp.1-18** Module Leader: Prof. Wan-Chi Siu Module Contributor: Mr. Zhi-Song Liu Other Contributors: Chu-Tak Li, Zhi Song Liu and Wai-Lam Hui Cum Dean (SCIS): Prof. Anthony Chan **Lab 5: GAN – Generative adversarial Networks, pp.1-14** Module Leader: Prof. Wan-Chi Siu Module Contributor: Mr. Li-Wen Wang, Other Contributors: Chu-Tak Li, Zhi Song Liu and Wai-Lam Hui Cum Dean (SCIS): Prof. Anthony Chan ……
Milestone in 1st year: (3) compose elementary AI modules, and commence collect data, 100% complete. Milestone in 2nd year: (1) compose functional and application AI modules, and commence collect data, 100% complete.	100%	**List of Demos and/or Software Modules developed** which are used for demonstration of the power of Deep Learning and the start-up of research topics. **1. Photo sketch:** This is a demonstration package for photo sketch making use of our technology: an end-to-end jump connection with elementwise multiplication technology. Zhi-Song Liu, Wan-Chi Siu, H. Anthony Chan, "Learn to Sketch: A Fast Approach for Universal Photo Sketch", Proceedings, Asia-Pacific Signal and Information Processing Association Annual Summit and Conference

Objectives*	Percentage Achieved	Remarks**
Milestone in 3rd year: (1) Produce teaching modules / laboratory exercises relating to AI, 100% complete.		(APSIPA-ASC'2021), 14-17 December 2021, Tokyo Japan. Chun-Chuen Hui, Wan-Chi Siu, Wen-Xin Zhang, and H. Anthony Chan, "Quality Photo Sketch with Improved Deep Learning Structure", Proceedings, IEEE TenCon'2022 (IEEE 2022 Region 10 Conference), Hong Kong, 1-4 November 2022. Module Leader: Prof. Wan-Chi Siu Module Contributor: Ryan Hui Cum Dean (SCIS): Prof. Anthony Chan, **2. Face Recognition** This is a demonstration package which allows system designer to recognize faces, initially making use of Inception Deep Learning technology and later making use of our technology ArtFace with new consistency loss for training, and the inclusion of new faces. Li-Wen Wang, Wan-Chi Siu, Yi-Hao Cheng and H. Anthony Chan, "Video Assisted Face Recognition in Smart Classroom", Proceedings, IEEE International Symposium on Circuits and System, 19-22 May 2024, Singapore. Module Leader: Prof. Wan-Chi Siu Module Contributor: Dr. Liwen Wang and Mr.Yi-Hao Cheng Cum Dean (SCIS): Prof. Anthony Chan, **3 Image Super-Resolution** This is a demonstration package to effect image super-resolution, and teaching students/participants the way to make image super-resolution in latent space. It makes use of our technology using Edge-Assisted Latent Space Inversion for high quality super-resolution. Xi Cheng, Wan-Chi Siu and Jian Yan, "Large-Scale Blind Face Super-Resolution via Edge Guided Frequency Aware Generative Facial Prior Networks", Proceedings, pp.1635-1540, APSIPA-ASC, 7-10 November 2022 Chiang Mai, Thailand Module Leader: Prof. Wan-Chi Siu Module Contributor: Mr. Eric Cheng and Dr. Liwen Wang and Mr.Yi-Hao Cheng Cum Dean (SCIS): Prof. Anthony Chan, **4. Face Manipulation Demo** This is a package to show that making use of

Objectives*	Percentage Achieved	Remarks**
		face manipulation techniques we can make a face talk for the sake of video broadcasting, and can use a simulated robot to teach a person to sing. There is full of fun, but the techniques are practically very useful. Ridwan Salahudeen, Wan-Chi Siu and H. Anthony Chan, "Activate Your Face in Virtual Meeting Platform", Proceedings, 2023 International Conference on Consumer Electronics-Taiwan (ICCE2023-Taiwan), Pingtung Taiwan, July 17-19 2023 Module Leader: Prof. Wan-Chi Siu Module Contributor: Mr. Ridwan Salahudeen Cum Dean (SCIS): Prof. Anthony Chan,
3. AI experts in different fields will be invited throughout the year to give AI lecture series to include training of interdisciplinary research. AI weeks will be conducted to give more intensive training. Such training aims to enable research in the different Schools and Departments. Other Institutions will also be invited.	100%	**The team organized 4 big events in these 3 and ½ years.** The 1st three were joint collaborations with IEEE, APSIPA, SFU, PolyU, Science Park, etc. and the 4th one was a collaboration with IEEE 2022 TENCON conference. Due to these collaborations, attendees were from Hong Kong, Japan, mainly China, Taiwan, Singapore, India, … As shown below are the events. **IEEE Tutorial on Deep Learning 5-6/3/2021, at SFU** **IEEE Workshop on Deep Learning 19-20/3/2021, at SFU** **Special Sessions/IEEE HK Sec. 50 Anniversary Magazine Edition in IEEETEN2022 1-4/11/2022, at Convention and Exhibition Centre** **IEEE Workshop on Deep Learning 3-4/4/2023, at Science Park, NT, Hong Kong** **<u>1 IEEE Tutorial on Deep Learning:</u>** **Title: 2-Day IEEE Tutorial on Deep Learning** **Date: Friday-Saturday, 5-6 March 2021** **Venue:** Lecture**: virtual** for outside participants; A320 for CIHE members **Lab** (optional): onsite any 2 evenings at 6:30-9:30pm on 5, 6, 8, 9 March **Organizer and Sponsor Units**: IEEE Hong Kong Section, IEEE HK Life-Member Affinity Group, HK PolyU, **St. Francis University (CIHE), UGC/IDS(R)11/19** **Co-Sponsors and Technical Co-Sponsor**: Asia Pacific Association on Signal and Information Processing (APSIPA), TeleEye Founders'Charity Foundation Ltd **Chief Speaker**: **Prof. Wan-Chi Siu**, *PhD, DIC, Life-FIEEE* **Other Speakers:** Dr. Tina, Xueting Liu, Dr.

Objectives*	Percentage Achieved	Remarks**
		Yingchao Zhao, Dr. Chengze Li and Dr. Zhisong Liu **Lab Lectuers**: Dr. Li Chengze & Dr. Liu Zhisong **Organizers*:*** **Prof. H. Anthony Chan,** *PhD, FIEEE, SFU (CIHE)* **Dr. Paulina Chan,** *PhD, Chair, IEEE HK Sect.)* This a 2-day tutorials organized mainly by SFU, IEEE and APSIPA. I was open for attendees from Hong Kong and Asia Pacific Region. **Objectives:** 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. 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 leaning**, for applications such as classification, de-noising and others. **Tutorial Schedule:** Friday 5 March 2021 9:00 a.m. - 12:00 noon **Opening Remark** (3 min, Prof. H. Anthony Chan) **General Presentation leading to Deep Learning** (2 hr, Prof. W.C. Siu) **Back Propagation** on Neural Network (1 hr, Dr. Yingchao Zhao) 2:00 - 5:00 p.m. **Non-Linear function and Deep Learning Layers** (1 hr, Prof. W.C. Siu) **UNet and Its application to Segmentation** (or De-noising) (1 hr, Dr. Tina Liu)

Objectives*	Percentage Achieved	Remarks**
		The ResNet (1 hr, Prof. W.C. Siu) Saturday 6 February 2021 9:00 a.m. - 12:00 noon **GAN (Generative Adversarial Network)** (2 hr, Prof. W.C. Siu) **The AlexNet and Realization** Technologies (1 hr, Dr. Zhisong Liu) 2:00 - 5:00 p.m. **RCNN** and/or **YOLO** (2 hr, Prof. W.C. Siu) **Pytouch Realization** for LeNet/AlexNet/ GoogleNet) (1 hr, Dr. Chengze Li) **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 to image processing**, for deep learning **denoising**, etc. **Those who finish these experiments should be able to i) start or enhance their research and/or ii) perform their engineering work making use of basic Deep Learning techniques** **Since the Tutorial involved Lab. Sessions, we limited the quota to 50. Eventually, there were 47 attendees.** **2 IEEE Workshop on Deep Learning:** **Title: 2-Day IEEE Workshop on Deep Learning** **Date: Friday-Saturday, 19-20 March 2021** **Venue:** Lecture**: virtual** for outside participants; A320 for CIHE members **Organizers*:*** **Prof. Wan-Chi Siu** *(PhD, Life-FIEEE),* **Prof. H. Anthony Chan** *(PhD, FIEEE),* **Dr. Paulina Chan** *(PhD, Chair, IEEE HK Section)* **Objectives:** The scope is much wider, including image segmentation, pattern recognition, classification, forecasting, .. making use of Deep Learning technologies. There are extremely useful for applications such as robotic, imaging, video analytic, surveillance, autonomous vehicle,

Objectives*	Percentage Achieved	Remarks**
		medical diagnosis, DNA identification, big data, business analysis, finance forecasting, etc. There is a mission of us for supporting **Continuing Education**, by answering the following questions in the preparation of our slices. 1. Explain the subject area for which you are going to talk about. 2. **Why Deep Leaning is useful in the subject area**? How? Advantage? 3. **How can one start** working in this direction? 4. What is the most common/existing way (one way is sufficient or at most two ways) using AI (especially Deep Learning) in this area? 5. **Give typical example(s) on the realization structure, network/package to be used** (e.g. Alexnet, or, ResNet, or ..), data format, preparation of training samples, testing **Contents and Speakers:** **Session 1: Friday, 19 March 2021, 9:00am-12:00nn** Session Chair: **Prof. Wan-Chi Siu**, *PhD, DIC, Life-FIEEE* **Opening Speech**: **Dr. Paulina Y. Chan**, *PhD, DIC, MBA, SrMIEEE,* Chair of IEEE Hong Kong Section (3 minutes) 1. **Deep Learning Baseline Model Design with sample application to Super-Resolution Imaging** **Prof. Wan-Chi Siu**, *PhD, DIC, Life-FIEEE, APSIPA Distinguished Lecturer* Emeritus Professor, Hong Kong Polytechnic University & Research Professor CIHE 2 **How to get Clear Vision in the Rain and Haze Environment using Deep Learning?** **Dr. Lap-Pui Chau**, *PhD, FIEEE* Associate Professor, Nanyang Technological University, Singapore **Session 2: Friday, 19 March 2021, 1:30 -6:00pm** Session Chair: ***Dr. Paulina Chan***, *PhD, DIC, SrMEEE,* Chair IEEE HK Section 3. Few-Shot Learning: Three Examples **Prof. Changshui Zhang**, *PhD, FIEEE, APSIPA Distinguished Lecturer* Professor, Tsinghua University 4. "Edge Learning for Distributed Big Data Analytics: Theory, Algorithm and System Design" **Prof. Song Guo**, *PhD, FIEEE*, Professor, Computing, The Hong Kong Polytechnic University 5. Computational and Learning Aspects of DNA

Objectives*	Percentage Achieved	Remarks**
		Sequences **Dr. Bonnie NF Law**, *PhD, SrMIEEE* Associate Professor, Hong Kong Polytechnic University **Session 3: Saturday, 20 March 2021, 9:00am-12:00nn** Session Chair: ***Prof. H. Anthony Chan***, *PhD, FIEEE* 6. Deep Learning for Computational Manga **Prof. Wong, Tien-Tsin**, *PhD, FHKIE, MIEEE* Professor, CS & Eng, The Chinese University of Hong Kong 7. Deep Learning for Speaker Recognition **Prof. Man-Wai Mak**, *PhD, SrMIEEE*, Professor, EIE, Hong Kong Polytechnic University We are glad to report the number of attendees ranges between **70 to 160 in all these sessions**, coming from Hong Kong, Japan, Chinese mainland, Taiwan, Singapore, Malaysia, India, etc. **<u>3.IEEE 2-day Workshop on Deep Learning</u>** **Location: Science Park** **Dates: Monday - Tuesday 3-4 April 2023** **Mode: face to face and Virtual Workshop.** This is yet another Deep Learning organized by us after the IEEETEN in 2022. Even though the Covid2019 had gone for just a while, we encourage much face-to-face attendance. Again, this Deep Learning workshop was open to all people in Hong Kong, and we also welcome participants from Asia Pacific Region (for the publicity from APSIPA) or other places in the world. **Workshop Schedule.** Day 1: Monday, 3rd April 2023, 9:00 am Session Chair. Prof. H. Anthony Chan, FIEEE Opening Speech: Dr. Paulina Y Chan, SrMIEEE **Keynote Speaker:** **Prof. C.C. Jay Kuo**, PhD, Fellow of IEEE, AAAS, ACM, IEEE, NAI, and SPIE, an Academician of Academia Sinica .., USC, USA **Title**: On the 2nd AI Wave: Toward Interpretable, Reliable, and Sustainable AI **Invited Speaker**: **Prof. M.W. Mak**, PhD, SrMIEEE, Professor and Interim Head (EIE), HK PolyU **Title**: Supervised and Self-Supervised Contrastive Learning for Speaker Verification Across Languages

Objectives*	Percentage Achieved	Remarks**
		Speakers: **Prof. Wan-Chi Siu**, PhD, DIC, Life-FIEEE, APSIPA Distinguished Lecturer, Emeritus Professor, Hong Kong Polytechnic University & Research Professor, CIHE Title: The Treasure of Latent space in Deep Learning for Super-Resolution and Other Applications **Dr. Chengze Li,** PhD, MIEEE, Assistant Professor, from Saint Francis University (formerly Caritas Institute of Higher Education) **Title:** Exploring Diffusion-based Image Synthesis and its Recent Advances for Creativity **Day 2: Tuesday, 4 April 2023, 9:00 a.m.** Session 3: Tuesday, 4 April 2023, 9:00 a.m. - 12:30 p.m. **Session Chair:** **Prof. Wan-Chi Siu**, PhD, DIC, Life-FIEEE **Invited Speaker**: **Prof. Saeid Sanei**, PhD, DIC, FBCS, SrMIEEE, Professor, Nottingham Trent University & Academic Visitor Imperial College London, UK **Title:** Mapping Scalp to Intracranial EEG for Detection of Interictal Epileptiform Discharges. **Dr. Tina, Xueting Liu**, PhD, SrMIEEE Assistant Professor, Saint Francis University (formerly Caritas Institute of Higher Education) **Title:** CLIP and CLIPasso: Semantic Understanding and Object Sketching Workshop Organizers: **Prof. Wan-Chi Siu**, PhD, DIC, Life-FIEEE, Advisor, IEEE Hong Kong Section **Prof. H. Anthony Chan**, PhD, FIEEE, Dean, SCIS, Caritas Institute of Higher Education **Dr. Paulina Chan**, PhD, DIC, SrMIEEE, Immediate-Past Chair, IEEE Hong Kong Section Sponsors: IEEE HK Section/HKS Life Member Affinity Group, APSIPA/APSIPA Distinguished Lecturer Program, HK Science Park, HK Polytechnic University, Caritas Institute of Higher Education (CIHE), TeleEye Founders' Charity Foundation, UGC/IDS(R)11/19 Details: please refer to the following website:

Objectives*	Percentage Achieved	Remarks**
		https://cis.sfu.edu.hk/2023.workshop/ **4. Special Sessions/IEEE HK Sec. 50 Anniversary Magazine Edition in IEEETEN2022 1-4/11/2022, at Convention and Exhibition Centre** **For details, please see pp.15-19.** 
Milestone in the 1st year: (4) Conduct collaboration session and seminar series, 100% complete. Milestone in the 2nd year: (3) Conduct collaboration session and seminar series, 100% complete.	100%	**17 AI talks were conducted in 2020:** Most of them were open presentations for all staff and students in SFU (CIHE). Prof. Wan-Chi SIU, "Sample Research in Digital Signal Processing with Machine Learning and Deep Learning Approaches," 20 December 2019. Dr. Ying Chao ZHAO, "Neural Network & BP Algorithm," 20 February 2020. Prof. Wan-Chi SIU, "Non-linear Function and Filter Structure in CNN," 12 March 2020. Prof. H. Anthony CHAN, "Distributed and Federated Learning," 2 April 2020 Prof. Wan-Chi SIU, "AlexNet – A Standard Structure of CNN," 16 April 2020 Dr. Xueting LIU, "End-to-end CNN and Image Segmentation," 4 May 2020 Prof. Wan-Chi SIU, "ResNet – A Breakthrough in Deep Learning," 21 May 2020 Dr. WenChao XU, "Reinforcement learning basis

Objectives*	Percentage Achieved	Remarks**
		and application case in networking," 19 Jun 2020 Prof. Wan-Chi SIU, "GAN – Generative Adversarial Network," 6 July 2020 Prof. Wan-Chi SIU, "GAN (Part II) – Training and More Applications," 20 July 2020 Prof. H. Anthony CHAN, "Introduction to AI in Natural Language Processing," 11 Aug 2020. Prof. Wan-Chi SIU, "Lab Highlight and Region-based Convolutional Neural Network," 25 Aug 2020 Prof. Wan-Chi SIU, "More RCNN and Additions to Lab Highlight," 8 Sep 2020 Dr. WenChao XU, "Reinforcement learning demo: Q learning and deep Q learning," 19 Nov 2020 Prof. Wan-Chi SIU, "Baseline Model Design with Joint Back Projection and Residual Network," 8 Dec 2020 Prof. Wan-Chi SIU, "Baseline Model Design with Joint Back Projection and Residual Network (Part II)," 15 Dec 2020 **14 AI talks were conducted in 2021:** Most of them were open presentations for all staff and students in SFU (CIHE). Prof. H. A. CHAN, "Data and Industry Trend," on 7/01/2021. Prof. Wan-Chi. SIU, "Convolutions" 08/02/2021. Hui LIU, "Learning Adaptive Graphs for Data Analysis," 22/04/2021. Dr. Zhi-Zhong LIU, "Deep Learning with YOLO: An Update of its Recent Development," 29/04/2021. Prof. Francis CHIN, "Advancement of NLP with Deep Learning," 12/05/2021.

Objectives*	Percentage Achieved	Remarks**
		Prof. Wan-Chi SIU, "Non-Local Means and Attention Network in Deep Learning," 20/05/2021. Prof. Wan-Chi SIU, "Attention and Transformer Network in Deep Learning," 3/06/2021. Dr. WenChao XU, "Reinforcement Learning Basis and Application Case in Networking," 19/06/2021. Dr. Zhi-Song LIU, "Attention for Image Super-Resolution," 24/6/2021. Mr. Kinson CHEUNG, "Guiding Behavior using AI-enabled Communication with Virtual Bosom Friend," 29/07/2021. Dr. Chengze LI, "Transformers for Computer Vision Applications," 16/08/2021. Dr. Zhi-song LIU, "Face Recognition via Convolution Neural Networks," 10/09/2021. Prof. Wan-Chi SIU, "Face Recognition: A review of the Classical Learning Approach," 23/09/2021. Mr. Eric W.H. Cheng, "A Conventional Moving Object Detection Approach on Video/Traffic Scene," 25/11/2021.
Milestone in the 3rd year: (2) Conduct collaboration session and seminar series, 100% complete.	100%	10 talks were conducted in 2022 - 30/6/2023: Most of them were open presentations for all staff and students in SFU (CIHE). Prof. H. A. CHAN, "AI, Interdisciplinarity, and Transformation of the Society" on 19/01/2022. Dr. Chengze LI, "Conditional Image Synthesis from Texts," on 11/05/2022. Alisdair C.O. LEE, "Blockchain-based federated learning with smart contract," on 11/10/2022. Xi CHENG, "StyleGAN and its applications," on 8/11/2022. Ziming HUANG, "High quality image synthesis

Objectives*	Percentage Achieved	Remarks**
Milestone in 3rd year: Conduct AI Symposium, 100 % completed.		with diffusion model," 0n 13/12/2022. Wing-Ho Eric CHENG, "Super-resolution using GAN model," on 7/02/2023. Chun Chuen Ryan HUI, "RePaint: an application of Diffusion Model for Inpainting," on 16/02/2023. Xin Cindy CHEN, "WiFi Fingerprinting Indoor Positioning using Deep Learning Model," on 2/03/2023. Ridwan SALAHUDEEN, "Brief Review on Technologies for making a Face Picture to Talk," 7/03/2023. Prof. Wan Chi SIU, "Attention for Image Super-Resolution," on 3/3/2023. **Organized** multiple AI sessions and toke some leading role at **IEEE TENCON 2022** Date: Nov 1-4 2022 Place: Hong Kong Convention Centre (for attendees from all over the world, especially from Asia Pacific region) (https://www.aconf.org/conf_182292/timetable.html) **Edited** the **IEEE Hong Kong Section 50th Anniversary Magazine** Editorial Board: **Editors** **Wan-Chi Siu**, PhD, Life-FIEEE Advisor, IEEE HK Section **H. Anthony Chan**, PhD, FIEEE, Dean, SCIS Saint Francis University formerly CIHE **Paulina Chan**, PhD, SrIEEE Immediate-Past Chair, IEEE HK Section **Secretary of Editorial Board:** **Mr. Lourdusamy Arokiasamy** Saint Francis University formerly CIHE Advisory Editors: Dr. Nim-Kwan Cheung, Prof. Paul Cheung, Prof. K.M. Luk, Prof. P.C. Ching, Prof. Vincent Lau

Objectives*	Percentage Achieved	Remarks**
		Authors: **Message IEEE President:** **Prof. K.J. Ray Liu**, IEEE President, 2022 1.Contemporary Visual Computing: A System Perspective, **Professor Chang-Wen Chen** 2.From Vertical Cavity Laser to 6G and Metaverse, Adventure of an IEEE Editor in Hong Kong Science Park, **Prof. Nim Cheung** 3. AI for Social Good: A Case Study of Near Real-time Street-level Air Pollution Estimation and Public Health Management, **Prof. Victor On-Kwok Li** 4.AI and Robotics, **Professor Kazuhiro Kosuge** 5.AI-Empowered 6G Wireless Communications, **Professor Khaled B. Letaief** 6.Silicon Photonics: An Introduction, **Prof. Hon Ki TSANG** 7. Challenges in Modern Power-Electronics Dominated Power Grid, **Professor C. K. Michael Tse** 8. Exact Feature Distribution Matching and Its Applications, **Professor Lei Zhang** 9. Network standards and collaboration in human life **Professor H. Anthony Chan** 10. Inherited a Rich Tegacy: we are rising towards new challenge **Dr. Paulina Chan** 11. Rethinking Education **Professor Paul Cheung** 12. Integrated Intelligence for 6G Wireless Systems **Professor Vincent LAU** 13 Magneto-electric dipole antennas, **Professor Kwai Man Luk** 14 Golden Opportunity for using Signal Processing Techniques in Deep Learning Advancement, **Professor Wan-Chi Siu**

Objectives*	Percentage Achieved	Remarks**
		15. Collaborative Edge Computing Enabling AIoT Applications **Professor Jiannong Cao** 16. Customized Machine Translation, **Professor Francis Y.L. Chin** 17. Deep Speaker Embedding for Robust Speaker Verification **Professor Man-Wai Mak** 18. Optical Fibre Sensors: From Predictive Maintenance of Railway to Smart Cochlear Implants for the Masses, **Professor Hwa-Yaw Tam** 19 Beyond PASTA (parametric spectro-temporal analyzer) **Professor Kenneth K.Y. Wong** 20. Reflections on Networked Control, **Professor Wing Shing Wong** 21. Secure Data Sharing and Analytics with Blockchain and Trusted Computing, Technologies **Professor Jianliang Xu** 22 Co-Clustering for Coherent Pattern Detection, **Professor Hong Yan** 23. Should Electric Motors Go Wireless? **Professor K.T. Chau** 24. Video analytics for Intelligent Transportation Systems **Professor Lap-Pui Chau** 25. Advanced Prediction Techniques Applied to Smart Grids **Professor C. Y. Chung** 26. 6G Mobile Edge Empowered Metaverse, **Professor Danny H. K. Tsang** 27. Intrinsic Duality, Causal (□.□)-inference, Machine Co-learning **Professor Lei Xu** 28. Network Coding: A New Paradigm for Network Communications **Professor Raymond W. Yeung** Organized "**Distinguished Speaker Session**" on **IEEE Hong Kong Section 50th** Anniversary (invited Talks) at IEEE TENCON 2023 on Nov 1 2022 at Hong Kong Convention Centre, accompanied with an

Objectives*	Percentage Achieved	Remarks**
		IEEE Hong Kong Section 50th anniversary magazine. **IEEE HK Sec. 50th Anniversary Invited talks (I)** Date: Tuesday, 1st November 2022 Time: 10:30 am -12:20 Place: S428, Hong Kong convention and exhibition centre (in IEEE TENCON'2022) Chairpersons: Professor Nim Cheung / Professor Wan-Chi Siu Professor Nim Cheung, PhD, Life-FIEEE **From Vertical Cavity Laser to 6G and Metaverse Adventure of an IEEE Editor in Hong Kong Science Park** Professor Victor On Kwok Li, ScD(MIT), FHKEng, Life-FIEEE, FHKIE **AI for Social Good: A Case Study of Near Real-time Street-level Air Pollution Estimation and Public Health Management** Professor Kazuhiro Kosuge, PhD, Life-FIEEE **AI and Robotics** Professor Jiannong Cao, PhD, MAE, FIEEE, DMACM **Collaborative Edge Computing Enabling AIoT Applications** Professor Francis Yuk Lun Chin, PhD, Life-FIEEE **Customized Machine Translation** Professor Hong Yan, PhD, FIEEE **Co-Clustering for Coherent Pattern Detection** **IEEE HK Sec. 50th Anniversary Invited talks (II)** Date: Tuesday, 1st November 2022 Time: 2:00 pm: 3.30 Place: S428, Hong Kong convention and exhibition centre (in IEEE TENCON'2022) Chairperson: Professor H. Anthony Chan Professor Kwai Man Luk, PhD FIEEE FREng FHKEng **Magneto-electric dipole antennas** Professor Hong Ki Tsang, PhD, FIEEE, Optica Fellow **Silicon Photonics: An Introduction** Professor H. Anthony Chan, PhD, FIEEE **Network standards and collaboration in human**

Objectives*	Percentage Achieved	Remarks**
		life Professor Wan-Chi Siu, PhD, DIC, Life-FIEEE **Golden Opportunity for using Signal Processing Techniques in Deep Learning Advancement** Dr. Paulina Chan, PhD (Imperial), DIC, MBA(Lon), SrMIEEE, CMgr, CCMI **Inherited a rich legacy, we are rising towards new challenges** (https://www.aconf.org/conf_182292/timetable.html) IEEE 2-day Workship on Deep Learning was held at Science Park on 3-4 April 2023. https://cis.sfu.edu.hk/2023.workshop/ For details, please refer to pp.10-12.
1. The School of Computing and Information Sciences will collaborate with other schools to conduct preliminary interdisciplinary research using AI and then follow with more interdisciplinary research proposals.	100%	**Proposals supported in 2021:** Collaborated between the 2 schools: Computing and Information Sciences and Humanity and Language on a successfully funded research proposal during 1/1/2021 to 30/06/2024: UGC/IDS(C)11/E01/20: Investigators: SIU Wan-Chi, CHAN Sin-Wai, CHAN Hing-hung Anthony, Title: **Creating an Automatic Football Commentary System with Image Recognition and Cantonese Voice Output.** Amount Awarded: **$ 6,793,100**
Milestone in 2nd year: (5) Submit research proposals with AI for specific and interdisciplinary topics. 100% complete.	100%	UGC/IDS(R)11/20: Investigators: MAK Kin-wah, CHAN Sin-Wai, CHAN Hing-hung Anthony, Title: "**Establishment of Techno-Humanities Research Centre**." (Funded by UGC from 2020/21) Amount Awarded: **$3,943,705** 2021: 4 other submitted research proposals were successfully funded by RGC (i)UGC/IDS(R)/11/21 Investigators: CHIU Dah-ming, WONG Yu-cheung, CHAN Hinghung Anthony, TSUI Ming-sum, Title: "**Data Science Research Centre for Social Policies and Services**." Amount Awarded: **$5,009,532**

Objectives*	Percentage Achieved	Remarks**
		(ii) UGC/FDS11/E01/21: Investigator: LIU Xueting and WONG Tien-Tsin, Title: "**Deep Comic Screening via Tone-aware Semantic Layer Analysis**," Amount Awarded: **$1,022,450** (iii)UGC/FDS11/E02/21: Investigator: LI Chengze, Title: "**Instance-aware Cartoon Stylization of Photo and Videos**" Amount Awarded: **$877,550** (iv) UGC/FDS11/E03/21 Investigator: ZHAO Yingchao Title: "**Facility Location Games with Ordinal and Cardinal Preferences**." (Funded by UGC from 2021/22 Amount Awarded: **$999,450.00** 2022: 7 research proposals submitted to RGC with 4 awarded. (i) UGC/FDS11/E01/22 Investigator: LEUNG Andrew Yee-tak, WONG Jack Ho, "**Chaotized Plasma for actively combating airborne COVID19**." Amount Awarded: **$833,054** (ii) UGC/FDS11/E02/22 Investigator: LIU Hui, HOU Junhui Title: "**Robust Graph-based lustering: From Shallow to Deep"** Amount Awarded: **$989,100** (iii)UGC/FDS11/E03/22 Investigator: LIU Tina Title: "**Calligraphic Animation Generation via Deep Stroke Segmentation and Contour-based Trajectory Identification"** Amount Awarded: **$1,089,150** (v)UGC/FDS11/E05/22 Investigator: SIU Wan Chi Title: "**Deep Learning Based Face Super-Resolution: for Small and Incomplete Images**.": Amount Awarded **$1,385,800**

Objectives*	Percentage Achieved	Remarks**
2. A conference or symposium will be organized or jointly organized to present the research results from both within Caritas Institute of Higher Education and from other institutions to achieve exchange and interactions.	100%	**See TENCOLN2022 above. (pp.15-19)**
Milestone in 1st year: (5) Conduct AI week/workshop. Milestone in 2nd year: (4) Conduct AI week/workshop. Milestone in 3rd year: (4) Conduct AI Symposium, 100% complete	100%	1. An IEEE Tutorials on Deep Learning was jointly organized with CIHE as the host and held on 5-6 March 2021 with 47 attendees. 2. An IEEE Workshop on Deep Learning was jointly organized with CIHE as the host and held on 19-20 March 2021 with 230 attendees. 3. IEEE 2-day Workship on Deep Learning was held at Science Park on 3-4 April 2023. https://cis.sfu.edu.hk/2023.workshop/ 4. Edited the IEEE 50th Anniversary Magazine, and organized a distinguished speaker session at IEEE TENCON 2023 on Nov 1-4 2022 at the Hong Kong Convention Centre with IEEE Hong Kong 50th Anniversary Magazine. (https://www.aconf.org/conf_182292/timetable.html)
Milestone in 2nd year: (3) Conduct AI week/workshop.	100%	5. An IEEE Tutorials on Deep Learning was jointly organized with CIHE as the host and held on 5-6 March 2021 with 47 attendees. For details, please see pp.6-8 6. An IEEE Workshop on Deep Learning was jointly organized with CIHE as the host and held on 19-20 March 2021 with 230 attendees. For details, please see pp.8-10.
(4) Milestone in 3rd year: Conduct AI Symposium, 100% complete	100%	Organized a distinguished speaker session at IEEE TENCON 2023 on Nov 1-4 2022 at the Hong Kong Convention Centre with IEEE Hong Kong For details, please see pp.15-19 Produced: IEEE Hong Kong Section 50th Anniversary Magazine.

Objectives*	**Percentage Achieved**	**Remarks****
		(https://www.aconf.org/conf_182292/timetable.html) For details, please see pp.15-19.
3. Preliminary research results with distributed AI research will be used to plan more research and to submit follow-up distributed research proposals.	100%	Done and Submitted.
(5) Milestone in 2nd year: Plan further work on distributed AI research, 100% complete.		After conducting initial work on use of block chain IoT in a distributed machine learning, further work is to solve the associated concept drift problem.
(3) Milestone in 3rd year: Submit distributed learning proposal, 100% completed.		2022: submitted Distributed learning Proposal (i) UGC/IDS(C)11/E01/22: CHAN Anthony Hing-hung, An AI Enabled Lateral Transshipment Optimization Model with Dynamic Shelf Life, Dynamic Pricing, FEFO Inventory Allocation Policy, Non-zero lead time and partial order.

* *Please refer to the originally approved objectives. If there are changes in objectives, please highlight the changes and quote the date of RGC approval for such changes.*

** *Please provide reasons for significant slower rate of progress when compared with the approved implementation timetable.*

5.4 Please attach photo(s) of acknowledgement of RGC-funded activities / facilities / equipment.

6. Research Outputs

6.1 What are the accomplishments of the project?

(i) Please provide reports on conference, seminar, workshop, exchange programmes or other activities held (if applicable).
(Please provide details of the activities organized, including the theme / objectives of the activities, targeted participants, attendance, analysis of participants, e.g. country of origin, research background, etc., evaluation forms of the activities and a summary of the participants' evaluation. Photos of the activities are preferred.)

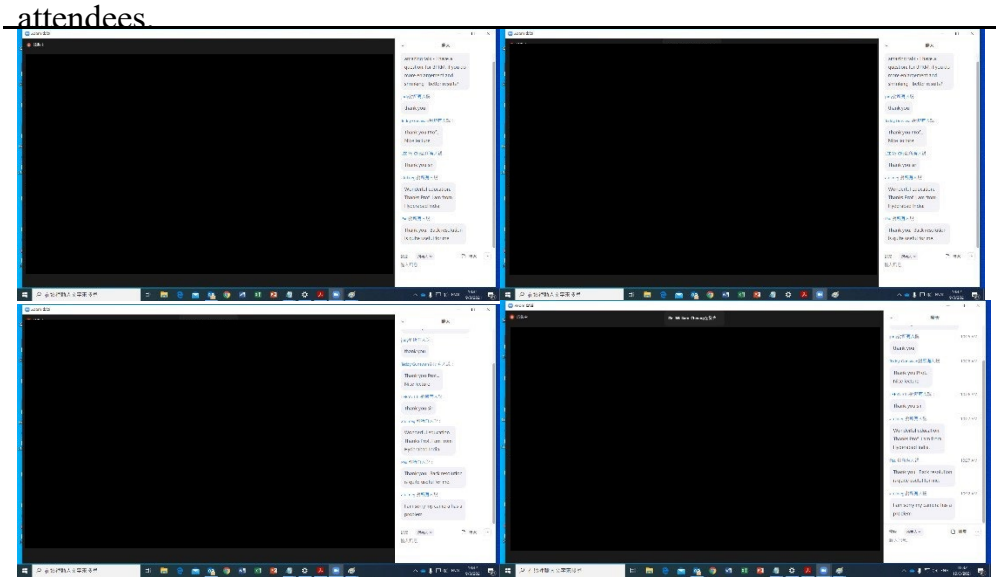
Presented 41 Talks (video records available) in 2020 (17 talks), 2022 (14 talks) and 2023/24 (10 talks) on Deep Learning. For details, please see pp12-14.

Produced 5 comprehensive Lab exercises and **4 Demonstration/Learning packages**. For details, please see pp3-6.

Organized on 5, 6 March 2021 IEEE Tutorial on Deep Learning, which was co-organized and co-sponsored by IEEE Hong Kong Section, IEEE Hong Kong Life-Member Affinity Group, and Hong Kong Polytech University, with co-sponsorship and technical co-sponsorship by Asia Pacific Association on Signal and Information Processing, TeleEye Founder's Charity Foundation, Ltd. There were 47 participants (Due to lab work restriction, 50 was the quota set.). For details, please see pp.6-8.

Organized on 19, 20 March 2021 IEEE Workshop on Deep Learning, with 230 participants. For details, please see pp.8-10.

attendees.



Participants at the IEEE Workshop on Deep Learning on March 19 2021.

Organized Special Sessions and Edited the EEE Hong Kong Section 50 Anniversary Magazine in IEEETEN2022 1-4/11/2022, at Convention and Exhibition Centre For details, please see pp.10-12)

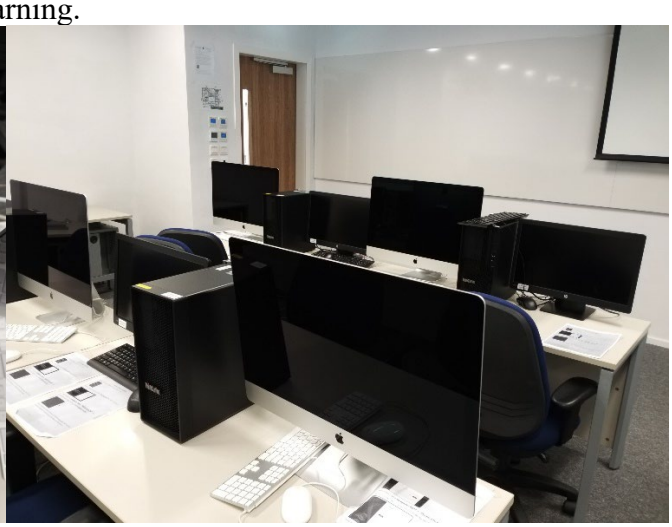
Organized IEEE Workshop on Deep Learning 3-4/4/2023, at Science Park, NT, Hong Kong, For details, please see pp.15-19.

Published 10 research papers in Journal or Conferences. For details, please refer to pp.28-29.

(ii) Please provide reports on asset purchase such as acquisition of research facilities, communal equipment, software licence, dataset and / or status of infrastructure / physical research structure building such as research centre, research supporting unit (if applicable).
(Please provide supporting documents and / or photos, and provide the utilization rate.)

Purchased big data central machine around September 2020. The server includes a large amount of memory space to enable backend storage of the large amount of data needed to perform deep learning. The memory has built in reliability to prevent data loss.

Purchased 10 AI systems for in day-to-day research. Each machine has the GPU to support low level of deep learning.



Purchased a deep learning central machine in March 2021. This central machine is being upgraded to accommodate 8 high-performance GPU's and a large amount of fast memory to run deep learning with big data available locally in the machine. This central machine is used for intensive deep learning tasks which can take over one week for each task even with a dual GPU machine.

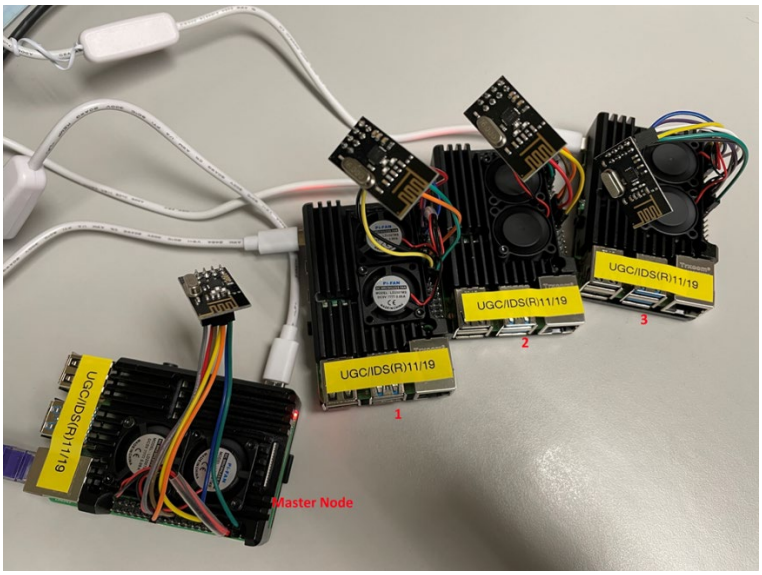
3 deep learning machines are purchased during 2021 as more staff are conducting AI research.

10 Potable AI machines equipped with RTX 3060 GPU are acquired in 2021 to enable staff to quickly conduct preliminary AI experiments from anywhere and to run demo off campus. This is especially helpful during the pandemic.

(iii) Please provide reports on research activities carried out (if applicable).

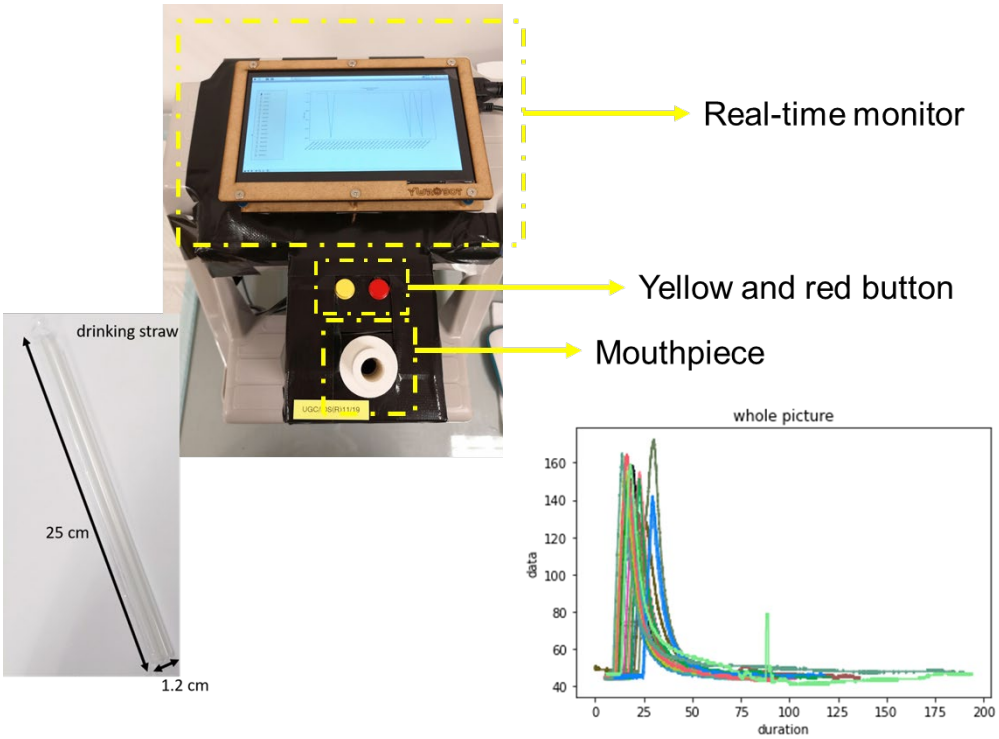
6.2 Please describe where and how the IDS Research Infrastructure Grant project assisted in building up the research capacity of the institution in its strategic areas (e.g. has the IDS Research Infrastructure Grant project facilitated the academics in formulating their research proposals under the Faculty Development Scheme, etc.).

Dr. Wen Chao XU (research associate) has set up AI modules with network cards to test distributed learning based MAC protocol. Itis a learning based TDMA system, that can efficiently assign time slots for different users and adjust them according to the external conditions, to guarantee the packet delivery delay and improve the MAC efficiency. The protocol can also run in top of common wireless protocols, e.g., WiFi, that require non-significant change to current products to improve the network performance.



Interdisciplinary research: (research assistant) collaborated with Dr. TONG Kwok Keung Tom, associate professor at the Department of Sport, Physical Education and Health at Hong Kong Baptist University to investigate changes in exhale air under potential health conditions. Alisdair has set up exhale order signal collection AI modules. The array electronic nose system includes automatic signal harvesting and uploading data from local drive to the cloud. It then utilizes the protected distributed learning paradigm to analyze the sensing data, which can support smart healthcare applications.

This research is motivated with the observation that the current healthcare system cannot tackle a quick diagnosis, prediction, and prevention, as traditional methods often require contact-based detection. The clinical data cannot be shared among different regions, and thus become difficult to employ the emerging big data analytics to mine the value for intelligence.
This end-to-end exhaling odor signal collecting system can utilize the recent progress in the electronic nose, Artificial Intelligence, Internet of Things, and machine learning technology to build an effective healthcare system that improves individual healthcare.



Interdisciplinary research: Professor Wan Chi SIU, Prof. H. Anthony CHAN collaborated with Prof. Sin Wai CHAN in the School of Humanities and Languages in interdisciplinary research in "Creating an Automatic Football Commentary System with Image Recognition and Cantonese Voice Output." Using football commentary in a practical system, the generalized technology of using Artificial Intelligence to identify and track the position and motion of the person/object in a scene and translate their actions and the events in the video into text and voice with specific style in an expert area is expected to be applicable in numerous other expert areas.

Interdisciplinary research: Prof. H. Anthony CHAN is collaborating with Prof. LAI CHENG Cheng Gea Alice in the School of Humanities and Languages in the use of Deep Learning to help the large number of school children with numerous read/write difficulties and also with the relatively more complex nature of Chinese characters.

6.3 If the project has not met its original objectives, why?
It meets its original objectives.

6.4 (a) Please provide details e.g., title, authorship, publication dates, etc. and attach an abstract of each publication reported. Please place **asterisks** on publications involving inter-institutional collaborations.

The following papers acknowledged the use of AI facilities provided in this project:

1. *Zhi-Song Liu, Wan-Chi Siu, and Yui-Lam Chan, "Features Guided Face Super-Resolution via Hybrid Model of Deep Learning and Random Forests, vol.30, pp.4159-4170, IEEE Transactions on Image Processing, 2021 (doi:10.1109/TIP.2021.3069554)

2. Huisi Wu, Yifan Li, Xueting Liu, Chengze Li, Wenliang Wu, “Deep texture cartoonization via unsupervised appearance regularization,” Elsevier Journal on Computers and Graphics 97 (2021), pp. 99-107

3. Chun On Lee, Paul Kwok-Ching Sun, and H. Anthony Chan, “A Token Label for Maturity Prediction using Current-Future Changing Rate,” Proceedings of 2021 International Conference on Computational Science and Computational Intelligence (CSCI), Las Vegas, USA, 15-17 December 2021.

4. *Zhi-Song Liu, Wan-Chi Siu, H. Anthony Chan, “Learn to Sketch: A Fast Approach for Universal Photo Sketch”, 2021 Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA-ASC’2021), 14-17 December 2021, Tokyo Japan.

5. *Zhi-Song Liu, Marie-Paule Cani and Wan-Chi Siu, “See360: 360-degree Novel View Synthesis”, pp1857-1869, IEEE Transactions on Image Processing, vol31, 2022.

6. *Li-Wen Wang, Wan-Chi Siu, Xue-Fei Yang, Zhi-Song Liu, and Daniel Pak-Kong Lun, “Highly Reliable Vehicle Detection through CNN with Attention Mechanism”, Proceedings, (pp.1-2, 978-1-6654-4154-4/22/$31.00 ©2022 IEEE) IEEE International Conference on Consumer Electronics (ICCE), 7-9 January 2022, Las Vegas, USA

7. *Li-Wen Wang, Du Li, Wan-Chi Siu, and Daniel Pak-Kong Lun, “Robust lane detection through automatic trajectory analysis with deep learning and big data environment", Proc. SPIE 12177, International Workshop on Advanced Imaging Technology (IWAIT) 2022, 1217725 (30 April 2022); https://doi.org/10.1117/12.2626131

8. *Chun-Chuen Hui, Wan-Chi Siu, Wen-Xin Zhang, and H. Anthony Chan, “Quality Photo Sketch with Improved Deep Learning Structure”, Proceedings, IEEE TenCon’2022 (IEEE 2022 Region 10 Conference), Hong Kong, 1-4 November 2022.

9. C. Alisdair Lee, K.M. Chow, H. Anthony Chan, and Daniel Pak-Kong Lun, “Decentralized governance and artificial intelligence policy with blockchain-based voting in federated learning.” Frontiers in Research Metrics and Analysis, Feb 2023. https://www.frontiersin.org/articles/10.3389/frma.2023.1035123/full.

10. H. Anthony Chan, Paul Hodgson, William Cheung, LapLi Chan, Hilman Tam and Keith Tsang, “A Design of Artificial Intelligence Education,” IEEE EdSoc Teaching, Assessment and Learning for Engineering, (TALE) Conference 2023, Auckland, 28 Nov – 1 Dec 2023.

(b) RGC funding should have been acknowledged in all activity(ies) / publication(s) / conference(s) papers listed in (a) above. If no acknowledgement has been made in any of the event / publication / paper, please indicate and provide explanations.

6.5 Research staff trained

(Please provide names and capacities of research staff trained and elaborate on what training has been provided.)

The following regularly participated in the AI research seminars throughout the course of investigation:

The following staff participated at the IEEE Tutorial/Workshop on Deep Learning:

6.6 Specific products
(e.g. patents, software or netware, instruments or equipment, infrastructure developed)

6.7 Other education activities and / or training and development

6.8 Please highlight any deliverables indicated in the project implementation timetable endorsed by RGC, which have not been covered or achieved as per sections 6.1 to 6.7 above, and explain / elaborate.

6.9 Please elaborate the role of the managing team in coordinating and managing the project.

Team leader and co-team leader have been meeting to monitor and to guide the project. The project management tasks include planning the details of the project, equipment acquisition, recruiting research staff, arranging training for staff, organizing talks and conferences.
Team Leader and Acting Director of Research have quarterly meeting to discuss the progress and resources of the project including manpower and facilities and equipment.

Management meetings are also conducted to review the progress chaired by the Project Holder..

7. Awards And Recognition

7.1 Have any research grants been awarded that are **directly** attributable to the results obtained on this IDS Research Infrastructure Grant project? *(Please provide details)*
Nil

7.2 Other awards and recognitions as a result of this IDS Research Infrastructure Grant project *(Please specify)*
Nil

8. Other Impacts

8.1 What are the current and expected impacts of the project in terms of its contribution to the local and regional economic and societal well-being? *(e.g., technology transfer, collaboration with external organizations, etc.)*

8.2 Others *(Please specify)*

9. Statistics on Research Outputs

	Peer-reviewed Journal Publications	**Conference Papers**	**Scholarly Books, Monographs and Chapters**	**Patents Awarded**	**Other Research Outputs (please specify)**	
No. of outputs arising directly from this project	4	6	0	0	Type	No.

10. Sustainability of The IDS Research Infrastructure Grant

10.1 Whether there are new ideas evolved **directly** from the project?

All our 10 published papers involved new ideas and novel suggestions. Interested readers can refer to them, since they can be accessed easily.

10.2 Whether there are new projects evolved **directly** from the project?

Yes, as it is evident from the fact that 10 new projects have been secured successfully, with a total fund of HK$22,862,892. This is a superior record.

10.3 Whether there are new collaborations developed **directly** from the project?

Yes, now we have a better collaboration with Hong Kong Polytechnic University, City University of Hong Kong, and Shenzhen University.

10.4 Please give details on how much money and from which sources has been obtained for the specific purpose of continuing the work started under this IDS Research Infrastructure Grant project.
Nil

Public Access Of Completion Report

(Please specify the information, if any, that cannot be provided for public access and give the reasons.)

Information that Cannot Be Provided for Public Access	**Reasons**

RGC Ref. No.:
UGC/IDS(R)11/19
(please insert ref. above)

INSTITUTIONAL DEVELOPMENT SCHEME (IDS)
RESEARCH INFRASTRUCTURE GRANT

Summary of Completion Report
(Please list all the stages since project inception)

Project Title: Establishment of Distributed Artificial Intelligence Laboratory for Interdisciplinary Research

Stage Completed	Period	[redacted]	Milestones	
	(Month / Year) to (Month / Year)		Deliverables to be Achieved[2] (Please summarize in three bullet points where details should be left to the report proper)	% of Each Deliverable Achieved[3]
1st Year	01/2020 - 12/2020		1. 2. 3.	1. 2. 3.
2nd Year	01/2021 - 12/2021		1…..	1…..
Final year	01/2022 - 06/2023		1…..	1…..
Total to-date:				

Note: [1] Justifications for significant under-spending or over-spending (≥ ±10%) should be given in **section 5.1** of the completion report.
[2] The key milestones to be achieved by the project within the respective stage as indicated in the approved implementation timetable.
[3] Justifications for significant slower rate of progress compared with the approved implementation timetable should be provided in detail in **section 4** of the completion report.