Co-organisers: HKSTP 20 PROPELLING SUCCESS YEARS FLAIR

Date:	30 November 2022 (Wednesday)
Time:	10:00 –17:00 (HKT GMT+8)
Format:	In-person at INNO^2 & Online via ZOOM
Venue:	INNO^2, 2/F, Building 17W, Hong Kong Science Park
Language:	English
Co-Organisers:	Hong Kong Science and Technology Parks Corporation Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)

RUNDOWN

09:45 – 10:00	**Online and On-site Registration Starts**
Capturing the Value of AI for Industrial Application Time and cost are key considerations to maximizing values in industries. As AI becomes the buzzword, how can its true value be captured and applied to save cost and time? This webinar will introduce leading innovations at Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR) that help industries advance in the path of Industry 4.0. Topics include predictive maintenance, defect identification, computer vision and more.	
10:00 – 10:05	**Welcoming Remarks** **By Mr. Albert WONG** *Chief Executive Officer, Hong Kong Science and Technology Parks Corporation*
10:05 – 10:15	**Opening Remarks** **By Mr. Edmond LAI** *Chief Executive Officer, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)*
10:15 – 10:40	**Topic: International FLAIR Cooperations** **By Mr. Guido LEENKNEGT** *Commercialization Manager, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)*
10:40 – 11:00	**Topic: Industrial Artificial Intelligence in Production Environment** **By Dr.-Ing. Benny DRESCHER** *Chief Technical Officer, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)*
11:00 – 11:15	**Tea Break**

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11:15 – 11:35	**Topic: Automatic Labelling in TFT-LCD Manufacturing** **By Dr. Francesco CURSI** *Software and Algorithm Engineer, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)*
11:35 – 11:55	**Topic: Tool Wear Prediction in CNC Machines** **By Mr. Francis YUAN** *Project Manager, AI and Software, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)*
11:55-12:45	**Networking Session**
	FLAIR Technology Demo at RCC Lab, 19W (Registered guests only) * • Session 1: 12:00 - 12:25 • Session 2: 12:25 - 12:50 **Assembly Point: INNO² reception*
12:45 – 14:00	**Lunch Break**

Intelligent Manufacturing and Complicated Process Management in Hong Kong

How Big Data and Artificial Intelligence can help level up operational performance for industries? In the webinar, we will introduce the importance and potentials of Industrial AI and Industrial Big Data.

By showcasing the innovative and impactful technologies/platforms being developed in Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR), the webinar will outline the prospect of applying these cutting-edge technologies to facilitate intelligent manufacturing and complicated process management for Hong Kong enterprises.

14:00 – 14:10	**Opening Remarks** **By Mr. Edmond LAI** *Chief Executive Officer, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)*
14:10 – 14:35	**Topic: Intelligent Process Performance Evaluation and Simulation System** **By Mr. Gavin HUANG** *Research Assistant, Artificial Intelligence and Data Science, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)*

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14:35 – 15:00	**Topic: AI Powered PHM Solution with IoT Edge Computing for Equipment Operation** **By Mr. Nicholas TAM** *Senior Research Assistant, Artificial Intelligence and Data Science, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)*
15:00 – 15:15	**Tea Break**
15:15 – 15:40	**Topic: Small Defects Inspection System for Objects with Reflective Surface** **By Dr. Frodo CHAN** *Senior Algorithm and Software Engineer, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)*
15:40 – 16:05	**Topic: Interactive Control System for Robot Manipulation** **By Dr. Leiliang GONG** *Researcher, Robotics and Artificial Intelligence*
16:05 – 17:00	**Networking Session**
17:00	**End of Programme**

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ABSTRACTS & KEYNOTE SPEAKER PROFILES

Topic: International FLAIR Cooperations

By Mr. Guido LEENKNEGT

Commercialization Manager, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)

Abstract

General introduction of FLAIR, co-operation with research institutes and industrial partners.

Biography

Mr. Guido LEENKNEGT
Commercialization Manager
FLAIR

Mr. Guido Leenknegt has been working for over 20 years in Hong Kong in senior management positions, establishing and growing businesses in capital goods industries for the Asia market. He has extensive experience in Sales, Operational, Management and Business Development for SEA region, Japan and mainland China, especially in the plastics processing and paperboard packaging converting industry.

Guido serves as Head of Business Development Asia/Pacific at INC Invention Center Limited focusing on AI implementations, Industry 4.0 topics and Products & Ventures. Guido is also Head of Commercialization at FLAIR, responsible for spin-off / start-up activities and active in Business Development for Industrial Partners.

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Topic: Industrial Artificial Intelligence in Production Environment

By Dr.-Ing. Benny DRESCHER

Chief Technical Officer, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)

Abstract

Industrial Artificial Intelligence (AI) is one of the key technologies to improve manufacturing operations. The presentation outlines major challenges in today's factories, and shows an overview of example use cases to apply AI in the shop floor. Among others, the presentation explains how AI automates processes, and reduces downtime of machineries and workstations. Furthermore, the presentation shows the capabilities of AI to deal with high variance and product mixes. It also displays ways to improve product and process quality by computer vision and machine data analytics.

Speaker biography

Dr.-Ing. Benny DRESCHER
Chief Technical Officer
FLAIR

Dr. Benny Drescher's passion and professional expertise lies in Industry 4.0, robotics, machine learning, and data analytic technologies. He worked with research institutes, corporates, and medium-sized companies from machinery, automotive, and manufacturing industries in Germany, USA, South Korea, Japan, and China.

Dr. Benny Drescher serves as Chief Technical Officer, Hong Kong Industrial Artificial Intelligence & Robotics Centre and Director Technology Artificial Intelligence, INC Invention Center at RWTH Aachen Campus in Germany. He also serves as Advisor at the German Accelerator in Singapore.

Previously, he co-founded two companies for drones/UAVs and data analytics technology. He has implemented consulting, engineering, and applied research projects with industrial partners at Fraunhofer IWU (Augsburg) and Technical University of Munich, Germany. He has worked with scientific committees on industrial standards and studies for the application of Information Technologies in the Manufacturing Industry. Furthermore, he is enthusiastic about entrepreneurship, and has supported students as Mentor at MIT Hong Kong Innovation Node.

Dr. Benny Drescher holds a B.Sc. and M.Sc. in Electrical Engineering and Information Technology, and a Dr.-Ing. (PhD) in Mechanical Engineering from Technical University Munich. He also received an Honors Degree in Technology Management from Center for Digital Technology and Management, Germany.

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Topic: Automatic Labelling in TFT-LCD Manufacturing

By Dr. Francesco CURSI

Software and Algorithm Engineer, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)

Abstract

Assessing quality of products in the manufacturing industry is a key element in the production process. Damages or defects in the products result in high revenue losses and customer dissatisfaction if not successfully identified and taken care of.

Computer vision (CV) and artificial intelligence (AI) can be a viable solution to speed up and improve the defect localization and classification, while also reducing human efforts and costs. Yet, large amount of data and expertise in building AI solutions is required.

We propose the development of a software platform to ease the implementation of CV algorithms and data collection to simplify and improve defect visual inspection in the manufacturing industry.

Speaker biography

Dr. Francesco CURSI
Software and Algorithm Engineer
FLAIR

Dr. Francesco Cursi obtained his PhD from Imperial College London in the field of robotics and received Master of Science degree from New York University and Sapienza University of Rome in Mechanical Engineering.

Francesco has previously joined Amazon's Pathways Operations Leadership program and the Italian Institute of Technology. His expertise spans topics in the fields of robot control, machine learning, and optimization.

Francesco's research has resulted in various papers being published and presented at top international robotics conferences and journals.

Francesco has also experiences working on start-up projects, both as founding member and as an advisor.

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Topic: Tool Wear Prediction in CNC Machines

By Mr. Francis YUAN

Project Manager, AI and Software, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)

Abstract

Predictive maintenance is one of popular applications in the Industrial 4.0. The talk focuses on one of the applications in the maintenance of CNC machine that uses Machine Learning to predict the lifespan of CNC machines to save the tool cost and reduce the machine downtime.

Speaker biography

Mr. Francis YUAN

Project Manager, AI and Software

FLAIR

Mr. Yuan's expertise is in the digital transformation and product management. He has years of experience in the industry globally. Now he is managing industrial projects in FLAIR as Project Manager.

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Topic: Intelligent Process Performance Evaluation and Simulation System

By Mr. Gavin HUANG

Research Assistant, Artificial Intelligence and Data Science, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)

Abstract

In the context of global integration and the post-epidemic era, logistics distribution centres play a pivotal role in the increasingly frequent world trade. Therefore, the need for global control, global visualization, data analysis automation, and identification of logistics bottlenecks to improve cargo handling capacity and operational efficiency per unit of time has become particularly urgent. Our solution provides a systematic visual interactive software platform for “bottleneck monitoring and forecasting of cargo transportation process” in the logistics and derivative supply chain industries. Among them, the monitoring function is composed of “process monitoring and evaluation algorithm” and “transport machinery equipment failure monitoring algorithm”; the prediction function is composed of “equipment failure root cause analysis algorithm” and “process bottleneck prediction algorithm”. Meanwhile, with the characteristics of high portability, end users can analyse huge amounts of logistics data by using this software platform anytime and anywhere.

Speaker biography

Mr. Gavin HUANG
Research Assistant
Artificial Intelligence and Data Science
FLAIR

Mr. Jinhui HUANG (Gavin) works as a research assistant, Artificial Intelligence and Data Science, in Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR), mainly undertaking tasks of data preprocessing and software packaging. Mr. HUANG obtained BEng. in New Energy Science and Technology from North China Electric Power University (Beijing) in 2019 and M.Sc. in Engineering Management from City University of Hong Kong in 2020.

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Topic: AI Powered PHM Solution with IoT Edge Computing for Equipment Operation

By Mr. Nicholas TAM

Senior Research Assistant, Artificial Intelligence and Data Science, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)

Abstract

Regular preventive maintenance is costly, and sometimes unnecessary as it replaces healthy mechanical parts before the end of their lifespan. Prognostics and Health Management (PHM) comes into play and has rapidly gained popularity in many fields. PHM proactively encourages repairs only when necessary, ahead of failures when certain degrading patterns are detected by means of artificial intelligence (AI) algorithms.

The PHM system, or the "Intelligent Fault Catcher", taps into the power of AI, edge computing, Industrial Internet of Things (IIoT), and 5G technologies and can proactively monitor real-time health condition of key components, identify root cause of failure, and predict next run failure with AI and predict remaining useful life of key parts. Based on PHM analysis, end-users can manage maintenance in a timely and efficient manner.

Speaker biography

Mr. Nicholas TAM
Senior Research Assistant
Artificial Intelligence and Data Science
FLAIR

Nicholas Tam received his Bachelor of Mathematics (B. Math) from the University of Waterloo, Canada, specialising in actuarial science and statistics. He has then obtained his Master of Data Science (M. DaSc) degree from the University of Hong Kong in 2022. Currently, Mr. Tam is a senior research assistant at FLAIR, working in the areas of artificial intelligence and data science. His current research interests include applying deep learning technologies in geospatial or temporal-spatial data.

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Topic: Small Defects Inspection System for Objects with Reflective Surface

By Dr. Frodo CHAN

Senior Algorithm and Software Engineer, Hong Kong Industrial Artificial Intelligence & Robotics Centre (FLAIR)

Abstract

The automation of visual defect inspection is beneficial for the quality control in the production line because the manual operation of visual defect inspection is subjective to the workers and the workers easily make mistakes for tedious jobs. Although the visual defect inspection can be widely used in different quality control areas including but not limited to the manufacturing of automobile parts, electronic parts, building materials, nonferrous metals, raw materials, invisibility of the defects is a challenging problem especially when their sizes are small and they appear on the reflective objects. Thus, our work aims to deal with this challenging problem and will be shared in the presentation.

Speaker biography

Dr. Frodo CHAN
Senior Algorithm and Software Engineer
FLAIR

Frodo Kin-Sun Chan received his PhD from Nanyang Technological University, NTU Singapore. Currently, he is a senior algorithm and software engineer in FLAIR. His research interests include computer vision, pattern recognition, and image processing for industrial uses.

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Topic: Interactive Control System for Robot Manipulation

By Dr. Leiliang GONG

Researcher, Robotics and Artificial Intelligence

Abstract

There is invariably a trade-off between safety and efficiency for collaborative robots (cobots) in human-robot collaborations. Accordingly, a new complementary framework is proposed for human-robot collaboration that balances the safety of humans and the efficiency of robots. In this framework, the robot carries out given tasks using a vision-based adaptive controller, and the human expert collaborates with the robot in the null space. Additionally, the robot can simultaneously learn the expert's demonstration in task space and null space beforehand with dynamic movement primitives (DMP). Human demonstration and involvement are enabled via a mixed interaction interface, i.e., augmented reality (AR) device.

Speaker biography

Dr. Leiliang GONG

Researcher
Robotics and Artificial Intelligence

Dr. Leiliang Gong is a postdoctoral researcher with expertise in Robotics and Artificial Intelligence. He obtained his B.A. degree in mechanical engineering from Jilin University in 2015 and his PhD degree from National University of Singapore in 2020. Dr. Leiliang Gong's current research interests include intelligent robot system, SLAM, augmented reality, etc.