產品可靠性暨系統安全研發中心
CENTRE FOR ADVANCES IN RELIABILITY AND SAFETY
A Research Centre admitted under *AIR@InnoHK* Cluster

CAiRS NEWSLETTER

JUNE 2023 ISSUE 9

Sharable Knowledge Database
共享知識數據庫

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Cover Story

A Conversation with Prof. Haibo Hu
與胡海波教授的對話

The Centre for Advances in Reliability and Safety (CAiRS) is committed to using innovative technologies to address product reliability and system safety challenges. In today's rapidly changing and complex world, having access to reliable, up-to-date information is more important than ever. We are excited to present the latest edition of our newsletter. It features a cover story that delves into a topic of "Sharable Knowledge Database" with Prof. Haibo Hu, Professor, Department of Electrical and Electronic Engineering at The Hong Kong Polytechnic University. Prof. Hu has published over 120 research papers in refereed journals, international conferences, and book chapters. He is an associate editor of ACM Transactions on Privacy and Security (TOPS), and a certified Cisco CCNA Security Trainer. His current research interests include cybersecurity, data privacy, internet of things, and adversarial machine learning.

產品可靠性暨系統安全研發中心（CAiRS）致力於使用創新技術來解決產品可靠性和系統安全方面的挑戰。在當今瞬息萬變的複雜世代中，獲取可靠、最新的信息比以往任何時候都更為重要。我們很高興介紹最新一期的通訊，今期封面故事邀請了香港理工大學電機及電子工程學系教授胡海波教授與大家探討"共享知識數據庫"的話題。胡博士在參考期刊、國際會議和書籍章節中發表了 120 多篇研究論文。他是 ACM Transactions on Privacy and Security (TOPS) 的副主編，以及思科CCNA安全認證培訓員。他目前的研究興趣包括網絡安全、數據隱私、物聯網和對抗性機器學習。

A Conversation with Prof. Haibo Hu
與胡海波教授的對話

1 Would you share your opinion on how knowledge database using AI technologies can help with reliability and safety?
請分享您對於使用人工智能技術的知識數據庫如何幫助提高可靠性和安全性的看法？

AI technologies are driven by big data. However, sharing raw data between various owners or shareholders not only causes privacy and reliability challenges, but also complicates the business models and incentive schemes. As such, building knowledge database that can be shared among businesses is a viable and effective way to enhance the robustness and reliability of AI technologies.

人工智能技術是由大數據驅動的。然而，在不同的擁有者或持份者之間共享原始數據不僅會帶來隱私和可靠性方面的挑戰，還會使商業模式和激勵計劃複雜化。 因此，通過構建可在企業之間共享的知識庫是增強人工智能技術穩健性和可靠性的可行且有效的方法。

2 Would you share some idea or methodology about using AI-based data visualization and modeling for processes, products or systems?
請分享一些關於使用基於人工智能的數據可視化和建模流程、產品或系統的想法或方法？

Nowadays, many AI techniques have been applied to the field of data visualization and modeling. For example, visualization-specific feature learning, such as visual encodings, can replace traditional feature engineering approaches that are labor-intensive. Another example, multimodal (e.g., text and images) feature fusion could improve the performance of text-chart embedding for better visualization.

現今，許多人工智能技術已經應用於數據可視化和建模領域。例如，特定於可視化的特徵學習（如，視覺編碼）可以取代勞動密集型的傳統特徵工程方法。另一個例子，多模態（如，文本和圖像）特徵融合可以提高文本圖表嵌入的性能，以獲得更好的可視化效果。

A Conversation with Prof. Haibo Hu
與胡海波教授的對話

3 What is the challenge to applying machine learning techniques on data analytics platform for reliability?
將機器學習技術應用於數據分析平台的可靠性挑戰是什麼？

My main concern is mutual trust. On the one hand, how can the data analytics platform be assured that the machine learning models trained on reliability data are trustworthy for use (e.g., classification or inference)? On the other hand, how can the machine learning models be assured that the data analytics platforms are feeding them with correct training or inference data?

我主要關心的是相互信任。一方面，數據分析平台如何確保在可靠性數據上訓練的機器學習模型值得使用（例如，分類或推理）？另一方面，機器學習模型如何確保數據分析平台正在為它們提供正確的訓練或推理數據？

4 What is your future research direction concerning reliability and safety?
您未來在可靠性和安全性方面的研究方向是什麼？

My future research involves two directions. The first is the study of generative models for reliability and safety data across various manufacturers. This can be considered as an alternative knowledge database which helps to boost the training data for reliability and safety research. The second is the automatic verification of an AI model in terms of its effectiveness, robustness, and reliability. This is an essential line of research for safety reasons, we cannot simply put a non-verified AI model to use in mission-critical environments, such as a medical instrument.

我未來的研究涉及兩個方向。 第一個是研究不同製造商的可靠性和安全數據的生成模型。 這可以被視為替代知識數據庫，有助於提高可靠性和安全性研究的培訓數據。 第二個是自動驗證人工智能模型的有效性、穩健性和可靠性。這是一項重要的研究，出於安全原因，我們不能簡單地將未經驗證的人工智能模型用於關鍵任務環境，例如醫療儀器。

SIGNING CEREMONY

CAiRS & BSUIR MOU SIGNING CEREMONY
CAiRS & BSUIR合作備忘錄簽署儀式

We are pleased to announce the signing of a Memorandum of Understanding (MOU) with Belarusian State University of Informatics and Radioelectronics (BSUIR), with the aim of collaborating to foster talent exchange in innovative reliability and safety research. BSUIR is the leading educational institution in information technologies, radio electronics, info- & telecommunications, and micro- & nanoelectronics. Through this collaboration, both institutions will leverage on their complementary strengths and strengthen talent resources for conducting research activities and other experience-sharing events in the future.

我們非常高興地宣佈與白俄羅斯國立信息與無綫電大學 (BSUIR) 簽署了合作備忘錄 (MOU)，合作促進創新可靠性和安全研究方面的人才交流。BSUIR 是信息技術、無線電電子、信息和電信以及微電子和納米電子領域的領先教育機構。透過這次合作，雙方將互補優勢，加強人才資源，以便在未來開展更多研究活動和其他經驗分享活動。

EXHIBITION

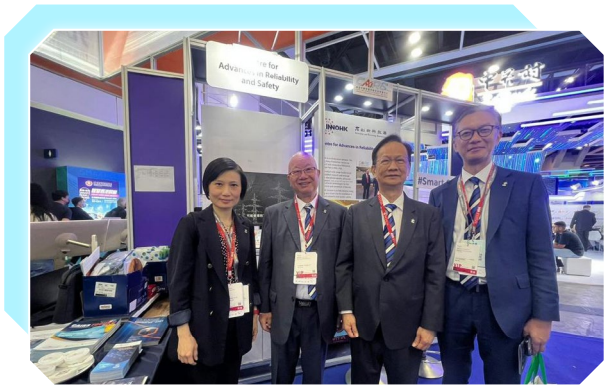
InnoEX 2023
香港國際創科展 2023

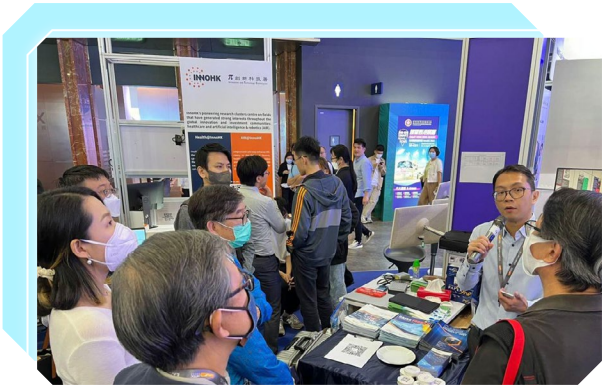
CAiRS participated in the InnoEX 2023 organized by the Hong Kong Government and the Hong Kong Trade Development Council at Hong Kong Convention and Exhibition Centre from 12 to 15 Apr 2023, where we showcased our latest advancements in AI-based reliability and safety innovation. The event was an excellent opportunity to learn, connect and exchange ideas with other professionals in the industry from the region and beyond.

Stay tuned for more exciting events and exhibitions from our Centre in the future.

CAiRS 參加了香港政府和香港貿易發展局於 2023 年 4 月 12 日至 15 日在香港會議展覽中心舉辦的香港國際創科展 2023，展示了我們在基於人工智能的可靠性和安全創新方面的最新進展。是次活動提供了與本地區及其他地區的業內專業人士互相學習、聯繫和交流的絕佳機會。

請繼續關注我們中心未來更多精彩的活動和展覽。





PUBLIC SEMINAR

"TRUSTS IN PRODUCT RELIABILITY AND SAFETY" PUBLIC SEMINAR
『對產品可靠性和安全性的信任』公開研討會

The CAiRS Public Seminar titled "Trusts in Product Reliability and Safety" which held on 9 May 2023 was a great success. There were about 100 attendees from different industries and backgrounds coming together to learn and engage in inspiring discussions. Thanks to the two speakers (Professor Michael Pecht, Distinguished Professor and Director, Center for Advanced Life Cycle Engineering, University of Maryland and Ms Gabriela Ehrlich, Director of Communications, International Electrotechnical Commission, IEC). They delivered comprehensive presentations that provided valuable insights on their respective fields. This seminar was a testament to the power of knowledge-sharing, and we look forward to seeing you in the next seminar.

For more information and details of the upcoming activities, please visit our website www.cairs.hk.

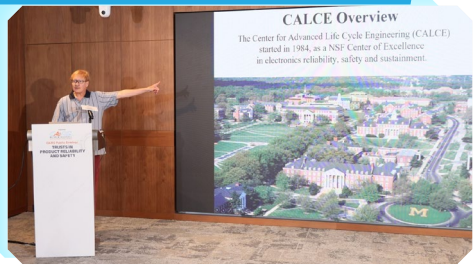
由本中心舉辦的公開研討會『對產品可靠性和安全性的信任』於2023 年 5 月 9 日已完滿結束，來自不同行業和背景近 100 名與會者聚首一堂，進行了啟發性的學習和討論。感謝兩位主講嘉賓（來自馬里蘭大學帕克分校Center for Advanced Life Cycle Engineering (CALCE)總監Michael G. Pecht教授和國際電工委員會 IEC的Gabriela Ehrlich女士）的深入介紹，就他們各自專業領域提供了寶貴見解。本次研討會證明了知識共享的力量，我們期待在下一次研討會上與您見面。

想了解更多有關CAiRS的最新消息及活動資訊，歡迎瀏覽我們網頁www.cairs.hk.

Featured speakers (Prof. Michael G. Pecht & Ms Gabriela Ehrlich) posed a group photo with Ir Prof. Winco Yung at the seminar
主講嘉賓(Prof. Pecht及Ms Ehrlich) 與容教授在研討會上合照留念

About 100 guests from the industries joined the seminar
近100名來自業界的嘉賓參與是次研討會

Prof. Michael G. Pecht, Distinguished Professor & Director, CALCE, University of Maryland
馬里蘭大學 (CALCE) 總監Michael G. Pecht教授



Q&A session in the seminar
研討會問答環節

Ms Gabriela Ehrlich, Director of Communications, International Electrotechnical Commission, IEC
國際電工委員會 IEC, Gabriela Ehrlich 女士

WORKSHOP

Workshop on Large Grant Application
大額撥款申請工作坊

Our Centre Director and Executive Director, Ir Professor Winco Yung was invited to share his successful experiences and insights in applying for large external research grants on 14 June 2023. This workshop attracted around 30 colleagues from the Faculty of Science at PolyU and the discussion was certainly a rewarding experience for all the participants.

本中心總監及執行董事容錦泉教授應邀出席於2023年6月14日由香港理工大學理學院舉辦有關大額撥款申請的工作坊，分享他申請大額研究資助的成功經驗和見解。是次工作坊吸引了約30名同事參加，而容教授的分享讓參與者獲益良多。

VISIT TO CAiRS

UMD RESEARCHER VISIT TO CAiRS
馬里蘭大學研究人員到訪CAiRS

We are thrilled to welcome researcher, Dr. Namkyoung Lee, from the University of Maryland (UMD), who came to visit us. During this visit, he shared with our research team his wealth of knowledge and experience in Prognostics and Health Management. We look forward to learning from each other and working together towards a shared goal of advancing innovative knowledge.

我們熱烈歡迎來自馬里蘭大學的研究員李南景博士來訪。在是次到訪期間，他與我們的團隊分享了在預測和健康管理方面的豐富知識和經驗。我們期待著相互學習並共同努力，以實現推進創新知識的共同目標。

Dr Namkyoung Lee received a Ph.D. in Reliability Engineering in the Department of Mechanical Engineering at the University of Maryland, USA. His research interests include data-driven prognostics and health management systems for rotating machinery and diagnostics and prognostics of automotive components.
李南景博士於美國馬里蘭大學機械工程學系可靠性工程專業取得博士學位。他的研究興趣包括旋轉機械的數據驅動預測和健康管理系統以及汽車部件的診斷和預測。

Sharing Session on Prognostic and Health Management for Automotive Safety Components
汽車安全部件的預測和健康管理分享會留念

In-depth discussion with CAiRS Project Leader and our team of researchers
與 CAiRS 項目負責人及其研究團隊進行深入討論和交流

VISIT TO CAiRS

POLYU COURT VISIT
香港理工大學顧問委員會到訪

It was a great honour to receive the Court Members and Senior Management from PolyU on 7 Jun 2023. During the visit, we shared with them our mission, showcased our research works and highlighted the impact we have on the community. We hope that their visit will lead to increased support and help us continue to make a positive difference in our society.

我們很榮幸於 2023 年 6 月 7 日接待來自香港理工大學顧問委員會和領導層團隊。在訪問期間，我們與他們分享了本中心的使命，展示了我們的研究工作，並強調了我們對社區的影響。我們希望他們的訪問將帶來更多的支持，並協助我們繼續為社會帶來積極的影響。

VISIT TO CAiRS

GUEST VISITS TO CAiRS
嘉賓到訪CAiRS

Guests from different local industries visited CAiRS to exchange insights in the areas of product reliability and system safety and had fruitful discussions on collaboration opportunities.

來自本地不同行業的合作夥伴參觀了CAiRS，就產品可靠性和系統安全領域上交流，並討論了協作的機會。

27 Apr 2023

Jekco Elevators Limited
捷高電梯有限公司

17 May 2023

Sun East Group Limited
日東集團有限公司

19 May 2023

CLP Team
中電團隊

9 Jun 2023

Synovate Technologies (Shenzhen) Co., Ltd.
升騰技術(深圳)有限公司

20 Jun 2023

Sanfield Construction Innovations Limited (SCIL)
新輝建築創科有限公司

CAiRS TEAM BUILDING

CAIRS TEAM BUILDING SERIES
CAiRS 團隊建立系列

27 Mar 2023

Lecture about Research Innovation of BSUIR in the field of Micro- & Nanoelectronics, and AI Property by Prof. Smirnov

Smirnov教授關於BSUIR在微納電子領域的創新研究與人工智能特性的講座

28 Apr 2023

知識產權專利分享研討會

Workshop on Patent Perspectives Insights on Intellectual Property

29 May 2023

Workshop on Writing Guidance of "A" Grade Journal Paper by Prof. Michael Pecht

關於"A"級論文寫作指導的工作坊

News Update

NEWLY GRANTED PATENT
新批予專利

We are pleased to update that two new patents have been granted lately.
我們很高興公佈兩項新的專利已被批予。

Title: A Defect Detection and Localization Method and System with Fusion Data Augmentation for Plastic Injection Molding Product
Patent No. : HK30080291

Title: A Health Index System and Method of Predicting Health Condition in Underground Cables
Patent No. : HK30081188

NEWLY PUBLISHED JOURNAL
最新發表期刊

1. Tianshan Liu*, Kin-Man Lam, and Jun Kong (2023). Distilling Privileged Knowledge for Anomalous Event Detection from Weakly Labeled Videos. IEEE Transactions on Neural Networks and Learning Systems.

2. Ching-Chi Yeung*, and Kin-Man Lam (2023). Attentive Boundary-aware Fusion for Defect Semantic Segmentation Using Transformer. IEEE Transactions on Instrumentation & Measurement.

NEW EQUIPMENT
新設備

We are delighted to introduce the newly equipped Temperature and Humidity Chamber (With Temperature Cycling). This new addition will enhance our capabilities and enable us to undertake more exciting research projects.

我們很高興為大家介紹新配備的温濕度試驗箱(溫度循環)。這一台新增設備將增強我們的能力，使我們能夠開展更多令人興奮的研究項目。

Description
描述

Industrial Applications
工業應用

Durability testing of a package undergoing extreme temperature variations over a given period of time.
在特定時段內承受極端溫度變化的組裝耐久性測試。

1. **Electronic Products 電子產品**
2. **Semiconductor半導體**
3. **Automotive/Electric Vehicle汽車/電動車**
4. **Machinery機械**
5. **Electrical Equipment電氣設備**

For more details, please scan the QR code
請掃瞄二維碼以索取詳細資訊