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College of Computer Science,
National Yang Ming Chiao Tung University

陽明交大資訊人
NYCU CCS MAGAZINE

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超越資訊領域　邁向新時代典範

時間過得很快，三年院長任期於今年七月結束，很榮幸八月續任資訊學院院長一職。三年前甫上任時，一直在想如何讓陽明交大資訊學院被全世界看見，很開心在今年的「交大日」完成了第一個里程碑；現在，在工程三館前豎立的「資訊先鋒牛車雕塑」，不僅具有台灣「第一部真空管電腦」在陽明交大的歷史意義，代表著陽明交大在台灣科技歷史上舉足輕重的地位，更勉勵著所有學子，繼續創新與努力，為陽明交大創造出更多新的里程碑。

身為台灣歷史最悠久的資訊學院，因應全球資訊安全潮流，本院於 108 年成立的「資通安全碩士學位學程」，也於今年正式升格為「資訊安全研究所」，除了以培養產業界與政府單位跨領域的高階資訊安全人才為目標之外，更期待能創造世界等級的研究成果並投入產業界，成為如同台灣 IC 設計與半導體產業般，擁有單一公司高達千億元產值的亮眼成績！

本院七十位全領域師資與 2000 多位學生是本院最重要的資產，今年一整年也繳出許多優秀的成績單。資工系林靖茹教授榮獲 111 年度國科會傑出研究獎，她的研究在整合軟體定義網路和人工智慧技術方面具有開創性的意義。謝續平教授團隊榮獲 IEEE Computer 期刊「2022 年傑出專欄論文獎」，2022 年下載超過千次，為下載次數最多的文章之一。新進教授劉育綸教授也榮獲教育部 112 年玉山青年學者，是本院指日可待深具潛力的年輕學者。

本院學生們的表現也不遑多讓，在 DEF CON（世界駭客大賽）全球知名資安技術研討會的 DEF CON CTF（搶旗攻防賽）賽事上，資工系學生及系友組成的「台灣聯隊 TWN 48」，打敗了來自中國、日本、韓國、丹麥、義大利等國駭客高手，獲得全球第三名的佳績！資工系同學們今年申請國科會「大專生研究計畫」成果傑出，有高達 21 件研究計畫獲得獎助！

本院歷史悠久，畢業校友們開枝散葉，今年陽明交通大學「交大日」，特別隆重盛大舉辦系友回娘家活動，讓凝聚力超強的資工系友們重聚在一起。除了選出 9 位在跨領域科技、5G 應用、科技轉型以及永續經營等領域取得傑出成就的傑出系友外，也特別邀請聯強國際 (股) 公司集團副總裁暨發言人杜書全學長，與廣達電腦執行副總經理蔡文弘學長，代表傑出校友致詞，勉勵在學學弟妹將基礎知識學好，再跟隨時代脈動擴張所學，以及看重失敗的經驗價值。

此外，也有許多校友捐獻軟硬體，提供本院更優質的學習環境，包括訊舟科技捐助 EDIMAX x NCTU Design Space、79 級學長姐捐贈機房、計工 70 級陳尚仁學長提供遠端監控與自動管理設備，以及奧圖碼股份有限公司捐贈 86 吋互動式觸控螢幕一台與智慧教室軟體等。

資訊科學為一跨領域整合應用之學科，本院歷經長期發展，除了在研究教學與產學各界，培養出許多頂尖人才之外，更成為醫療、教育、金融等眾多領域創新的領頭羊，期待本院的學生在台灣創新改革的關鍵時刻，成為最具有影響力的推手，高教領域的新典範。

資訊學院院長

陳志成

2023.12

Transcending the Information Field Stride Towards a Paradigm of the New Era

Time flies, and my three-year tenure as the dean concludes this July. I am pleased to announce that I have continued my service as the dean of the College of Computer Science starting in August. Reflecting on my initial assumption of office three years ago, my focus was on how to raise the global profile of the College of Computer Science at National Yang-Ming Chiao Tung University (NYCU). I am thrilled that we reached a significant milestone on this year's "University Day." The "Computer Pioneer Ox Cart Statue" now standing in front of Engineering Building 3 not only commemorates the historical significance of the first vacuum tube computer in Taiwan at NYCU but also symbolizes the university's influential role in Taiwan's technological history. It serves as a source of inspiration for all students to persist in innovation and diligence, contributing to more significant milestones for National Yang Ming Chiao Tung University.

As the longest-standing school for computer science in Taiwan, our college has responded to global cybersecurity trends by officially elevating the "Graduate Degree Program of Cyber Security," established in 2019, to the "Institute of Computer and Communications Security" this year. In addition to cultivating highly skilled information security professionals with interdisciplinary expertise for both the industry and government agencies, our goal is to produce excellent research results and contribute them to the industry. We aspire to achieve outstanding results, comparable to Taiwan's IC design and semiconductor industry, that a single company can reach an impressive value in the billions of dollars!

The seventy faculty members spanning diverse fields and the over two thousand students constitute the most valuable assets of our college. Throughout this year, we have achieved numerous outstanding academic accomplishments. Professor Kate Ching-Ju Lin has been honored with the 2022 National Science and Technology Council Outstanding Research Award for her groundbreaking research, which integrates software-defined networking and artificial intelligence technologies. Professor Shiuhpyng Shieh's team was recognized with the 2022 Outstanding Column Paper Award from the IEEE Computer Journal. In 2022, their paper achieved 1,000 or more downloads, placing it among the most frequently downloaded articles. Additionally, the recently appointed Professor Yu-Lun Liu has been named a 2023 Yushan Young Scholar by the Ministry of Education, highlighting him as a promising and highly potential young scholar within our college.

Our students have also demonstrated remarkable performance. In the DEF CON (World Hacker Conference) widely recognized cybersecurity technical seminar DEF CON CTF (Capture The Flag) competition, the "Taiwan Team TWN 48," consisting of students and alumni from the Department of Computer Science, surpassed hackers from China, Japan, South Korea, Denmark, Italy, and various other countries, securing an impressive third place on a global scale! Furthermore, this year, students excelled in the application for the NSTC undergraduate research project, with as many as 21 projects receiving grants and recognition for their outstanding contributions.

The esteemed history of our college spans generations, with our alumni flourishing in various fields. This year, as part of the University Day celebration at Yang Ming Chiao Tung University, we organized a special Homecoming Day, reuniting a highly cohesive group of CCS alumni. Alongside acknowledging nine outstanding alumni excelling in cross-disciplinary technology, 5G applications, technological transformation, and sustainable business, we were privileged to invite two distinguished alumni, Shu-Chyuan Tu, Vice President and Spokesperson of Synnex Technology International Corporation, and Wen-Hong Tsai, Executive Vice President of Quanta Computer Inc., to deliver speeches on behalf of our distinguished alumni. They urged current students to excel in their fundamental knowledge, stay abreast of contemporary trends, broaden their educational horizons, and appreciate the value of experiences, even gained through failure.

Moreover, numerous alumni have enriched our learning environment by contributing both hardware and software to our college. These generous donations include the EDIMAX x NCTU Design Space, sponsored by Edimax Technology Co., an Internet Data Center gifted by alumni from the Class of '79, remote monitoring and automatic management equipment provided by Shang-Ren Chen from the Class of '70, and a substantial contribution from Optoma Corporation. Optoma Corporation gifted a smart classroom solution featuring an 86-inch interactive touchscreen.

The field of Computer Science is characterized by its interdisciplinary and integrative nature. Throughout the substantial evolution of our college, we have not only fostered numerous outstanding individuals through research, teaching, and partnerships with diverse industries, but have also taken the lead in innovation across various sectors such as healthcare, education, and finance. We anticipate that our college s students, particularly during crucial junctures of innovation and reform in Taiwan, will emerge as the most influential advocates, contributing to the establishment of a new paradigm in higher education.

Dean of the College of Computer Science

2023.12

70 位全領域師資，是陽明交大最大資產
校友連結緊密，緊鄰竹科具地利優勢

文／曾子軒，本文轉載自遠見雜誌第 20230926 期 2024 研究所指南

其他院校談到自家系所有何亮點、哪裡與眾不同時，都有各擅勝場的領域。但對陽明交通大學資訊學院院長陳志成來說，沒有特別挑出，如資料科學、電信網路等分科的必要。

因為高達 70 位、涵蓋全領域的師資，就是令他驕傲的最大本錢。

獨立資訊院所，鞏固資源

陳志成強調，「我們有獨立的資訊學院，不是下轄在電資學院底下，」陽明交大資訊學院共有包含資工系在內的兩種學士班、涵蓋數據科學與工程在內的五種碩士班，另外，和國防部、警政署合作設有在職專班。

陳志成表示，陽明交大就是資訊第一品牌，「我們是全台灣最大，老師有 70 位、學生有 2000 多位，歷史也是最久。」不只規模傲人，《遠見》與 104 人力銀行合作調查，資訊學群中，陽明交大碩士畢業生為起薪最高者。

有許多因素能夠解釋這份成績單，但陳志成認為師資是關鍵。他以資安領域為例，系上就有好幾位專門研究資通安全的老師，也設有專門學程，不會將其他老師掛名宣傳。

其他因素如校友連結緊密、緊鄰竹科區位優勢，也讓資工系所和整個資訊學院受惠。資訊工程系系主任黃俊龍分享，系友會主動探詢無償在學校授課的機會，其實就是業界缺人，紛紛提早進入學校布局的具體展現。

陳志成表示，因為系所創立甚久，畢業生已開枝散葉、形成綿密網絡，不只樂於回饋職缺給在學生，「大家會有種肥水不落外人田的想法，」因此，建置新館舍、替教授加薪時向系友募款，也會得到熱烈響應。

近年來，頂尖大學都在力拚國際化，陳志成也分享目標：研究所以全英文授課。他希望藉此提升國際化學生生源、讓台灣學生得以和國際接軌，也意在吸引國外優秀人才來台授課。「希望過幾年你們來訪問時，院長不會講中文，就代表我們成功了。」

跨域合作是顯學，無懼潮起潮落

隨著就業市場報酬提高，學生選擇資工科系動機也會上升。陳志成認為，有許多領域對資訊人才都需求孔急，例如醫學領域的智慧醫療、財經領域的金融科技，甚至資訊學院底下的學程，也有相似的跨域情況。

資通安全碩士學位學程主任吳育松分享，早期談及資安，人們可能會想到電腦病毒，但現在不只是網路產業，包含金融領域，也開始將目光放在資安，「它不是一個獨立學問。」

吳育松強調，學程即將升格成研究所，希望以平台概念，和校內不同學院研究者跨領域合作。

目前資安學程實作上偏向培養技能型「駭客」，除了參與駭客競賽以外，也有和業界、數發部以及國防部合作；同時，也發展理論研究、提升學術量能。

不過，吳育松坦承，客觀來看，資安產業產值無法與 IC 及半導體相比，「我們核心技術，還是沒有到世界一流的水準。」陽明交大設立學程目的，就是希望能一樣擁有世界一流的核心技術，而這需要花上 10 年、20 年長期推動。

除了跨領域，資訊學群另一大特色就是不斷改變，且子領域會經歷潮起潮落，例如人工智慧就曾經歷政府放棄、企業撤資，度過不只一段寒冬期。

吳育松認為，做為龍頭型大學，陽明交大沒有必要逐浪，「你不該說現在 AI 熱門，所有老師全部都下去做，」比起預測新浪頭，更應培養有能力站上每波漲潮的學生。「客觀來講，我們資源夠多，什麼樣的老師都有。」

陳志成也分享，資訊學院目前正在招聘專精醫療應用的資工學者，原因就是和校內醫學科系合作。不過，即使迎接新教師，「非熱門」領域也不用擔心退場問題，因為今日的小眾，說不定在十年後就會成為大眾。跨域合作機會、學院擁有足夠資源，都讓陽明交大能夠精耕不同領域。

“PEOPLE”– The most significant asset of the College of Computer Science At the National Yang Ming Chiao Tung University

Translated by Haydn Chen

When it comes to discussing the unique features or distinctive qualities of one s own departments or colleges, many often emphasize specific disciplinary fields or topics of studies, or equipment and facility. However, for Dr. Chen Jyh-Cheng, Dean of the College of Computer Science at the National Yang Ming Chiao Tung University (NYCU), there is no need to specifically highlight subfields such as data science, or telecommunications networks, because of the faculty size, numbering up to 70, and diverse research they engage in, so that the most significant asset of the College is simply PEOPLE , and that is what Dean Chen takes the most pride in.

Empowering Excellence: Independence Unites Resources

Chen Jyh-Cheng emphasizes: "We have an independent College of Computer Science (CCS), not a department under the College of Electrical Engineering and Computer Science (EECS) or the College of Engineering (COE) as in a traditional university structure. NYCU s CCS is composed of one Department of Computer Science offering two undergraduate programs, and five Postgraduate Degree Programs including master degrees in data science and engineering, etc. Moreover, CCS collaborates with the Ministry of Defense and the Police Bureau to provide in-service programs.

Dean Chen states that NYCU CCS is the leading brand in information technology. He says, "We are the largest in Taiwan, with 70 plus faculty members and over 2,000 students, and we also have the longest history." Not only does the university boast an impressive scale, but according to a joint survey conducted by "Global Review Monthly" magazine and the 104 Job Bank, NYCU's master's graduates in the field of information technology have the highest starting salaries.

There are many factors that can explain this achievement, but Dean Chen believes that the faculty is the key. He uses the field of cybersecurity as an example, mentioning that the college has several professors who specialize in information security and offers dedicated programs without putting their names in the spotlight.

Other factors are close alumni connections and the strategic location of NYCU near the Hsinchu Science Park, where industry and national facilities are easily accessible. Professor Huang Jiun-Long, Head of Department of Computer Science, shares the same sentiment and said: alumni actively seek opportunities to teach at NYCU without compensation , which is a tangible manifestation of the industry's demand for skilled professionals and their willingness to engage with students early on.

Explained by Dean Chen that because the department has been established over half a century, its alumni have branched out and formed a close-knitted network. They are not only willing to provide job opportunities for current students but also have a sense of ownership, which is why fundraising efforts for building new facilities or supplement professor salaries usually receive enthusiastic responses from alumni.

In recent years, top universities have been striving for internationalization, and Dean Chen also shares this goal of offering graduate programs entirely taught in English. He hopes that by doing so, they can increase international and exchange students, allow Taiwanese students to align with the international community, and also attract talented individuals from abroad to teach and research in NYCU. "I hope that in a few years when you come to visit again, the dean won't speak Chinese anymore, which would mean we have succeeded", said Dean Chen to a reporter.

Cross-Domain Collaboration: Embracing Waves, Unfearing Tides

With the increasing rewards in the job market, students' motivation to choose computer science-related programs is also on the rise. Dean Chen believes that there is a high demand for information technology talent in many fields, such as smart healthcare in the medical sector, financial technology in the finance sector, and even interdisciplinary programs within the College of Information, all of which contribute to this growing interest and demand for computer science education.

Professor Wu Yu-Sung, Director of the Master's Program in Information Security, shares that in the early days, when people talked about cybersecurity, they might have thought of computer viruses. However, nowadays, cybersecurity is not limited to just the Internet industry; it extends to fields including finance. He emphasizes that it is not a standalone discipline. Wu further highlights that the program is about to be elevated to a research institute level. We aim to adopt a platform concept and encourage interdisciplinary collaboration with researchers from various departments within the university , said Wu.

In addition to interdisciplinary collaboration, another major characteristic of the Information Science community is its constant evolution, with subfields experiencing cycles of rise and fall. For instance, artificial intelligence (AI) has gone through periods where government interest waned and businesses divested, enduring more than one winter season.

Prof. Wu believes that as a leading university, NYCU doesn't need to chase every trend. He says: "You shouldn't say that AI is popular now, so all the professors should jump on the wagon." Instead, the focus should be on nurturing students to have ability to ride each wave of technology. He also notes that NYCU has abundant resources and a diverse faculty to nurture students to be the leaders of the future.

Dean Chen also shares that the College is currently recruiting computer science scholars specializing in medical applications due to collaborations with bio-medical departments. However, even in less popular areas, there's no need to be concerned because the rapid change in the field; what is today s niche area might become mainstream in ten years. At NYCU with academic strengths in technology and bio-medicine, there are ample opportunities for interdisciplinary cooperation within the college and with domestic and international partners. NYCU is promised to excel in innovation and technology-driven bio-medicine and healthcare, where computer and information science shall play a pivotal role.

本院與伊利諾大學簽署合作備忘錄

文／林珮雯

陽明交大資訊學院、醫學院、工學院、產創學院及電機學院於今年四月組成代表團訪問美國伊利諾大學香檳分校 (University of Illinois Urbana-Champaign, UIUC)，兩校已進展到多個領域的實質交流與合作。今年十月本院已與美國伊利諾大學香檳分校訊息科學學院 (School of Information Sciences, iSchool) 簽署合作備忘錄，落實雙邊夥伴定位。本院也進一步與伊利諾大學資訊系 (Department of Computer Science, CS) 簽署 3+2 雙聯學位，以呼應本校發展的重點，並且加深本院的國際鏈結。

在本校程海東策略長全力促成下，本院陳志成院長、陳添福副院長以及黃俊龍系主任於今年四月拜訪美國伊利諾大學香檳分校，拜會 iSchool 院長 Eunice E. Santos 以及副院長 Stephen Downie，洽談雙邊合作學術交流機會。同時，本院亦拜訪伊利諾大學資訊系，與系主任 Nancy Amato 及副主任 Tandy Warnow，商談雙邊合作具體行動。

今年十月由林奇宏校長率領團隊與伊利諾大學系統及伊利諾大學香檳分校簽署了四份極具象徵性，同時也富開拓性的合作備忘錄，簽署單位分別為以開拓創新產學為主體的伊利諾大學系統 Discovery Partners Institute（DPI)，伊利諾大學香檳分校訊息科學學院 (iSchool)、工學院、醫學院。其中，本院與 iSchool 與工學院簽署合作備忘錄，雙方期許未來能夠深化學研合作，並發展長期國際合作夥伴關係。簽約儀式後，UIUC Department of Computer Science 學術副系主任 Mahesh Viswanathan 與陳志成院長完成雙聯學位協議書的細節。本系學生最快能在本系就讀 3 年，在 UIUC CS 就讀 2 年，即可取得本系學士學位以及 UIUC CS 碩士學位。期許未來能夠深化資訊學院與 UIUC CS、iSchool 更多的合作，並擴大本校國際能見度。

本校與伊利諾大學香檳分校近年來互訪頻繁，每次都激盪出新的火花。兩校的交流立基工程領域雙聯學位合作，本次出訪開拓了與資訊學院的合作，充份展現伊利諾大學香檳校區和陽明交大之間密切的交流和合作。藉由雙邊固定互訪，堅固既有合作，激盪創新可能，為兩校的學術交流、研究發展、企業創新開展更多的可能性，落實國際鏈結。

NYCU CCS Signs Memorandum of Understanding with the University of Illinois

A delegation from the College of Computer Science, College of Medicine, College of Engineering, Industry Academia Innovation School, and College of Electrical and Computer Engineering at National Yang Ming Chiao Tung University visited the University of Illinois Urbana-Champaign (UIUC) in the United States in April. Both institutions have significantly advanced their collaboration across various fields. In October of this year, our college and the School of Information Sciences (iSchool) at UIUC signed a memorandum of understanding, formally consolidating an existing relationship between the two institutions. Additionally, our college has forged an agreement with the Department of Computer Science (CS) at the University of Illinois Urbana-Champaign for a 3+2 dual-degree program. This initiative aligns with our university's developmental focus and seeks to enhance the international connections of our college.

This April, facilitated by the efforts of NYCU Chief Strategy Officer Haydn Chen, Dean Jyh-Cheng Chen, Associate Dean Tien-Fu Chen, and Department Chair Jiun-Long Huang from the College of Computer Science visited the University of Illinois Urbana-Champaign. During the visit, they held discussions with the iSchool's Dean, Eunice E. Santos, and Associate Dean Stephen Downie to explore opportunities for mutual academic exchanges. Simultaneously, they also visited the Department of Computer Science at UIUC, engaging in conversations with Department Chair Nancy Amato and Vice Chair Tandy Warnow to identify specific actions for fostering bilateral collaboration.

In October 2023, President Chi-Hung Lin led a team in signing four significant and pioneering memoranda of understanding with the University of Illinois System and the University of Illinois Urbana-Champaign. The signatories included the Discovery Partners Institute (DPI), an innovative and collaborative research center led by the University of Illinois System, as well as the School of Information Sciences, the College of Engineering, and the College of Medicine at the University of Illinois Urbana-Champaign. Specifically, our college entered into a memorandum of understanding with the iSchool and the College of Engineering, aiming to intensify collaboration in academia and research while fostering a lasting international partnership. Following the signing ceremony, Dr. Mahesh Viswanathan, Associate Head for Academics of the Department of Computer Science at UIUC, and Dean Jyh-Cheng Chen of the College of Computer Science at NYCU concluded the details of a dual-degree agreement. According to this agreement, students from our department can obtain a bachelor's degree from NYCU CS and a master's degree from UIUC CS after three years of study in our department and two years at UIUC CS. We hope to deepen collaboration between the College of Computer Science and UIUC CS, iSchool, to further expand our university's global presence shortly.

In recent years, our university has engaged in regular reciprocal visits with the University of Illinois Urbana-Champaign, with each visit sparking fresh insights. The partnership between the two institutions is deeply rooted in the dual-degree engineering program. This visit signifies an expansion of our collaboration with UIUC CS, emphasizing the close-knit exchange and collaboration between the University of Illinois Urbana-Champaign and National Yang Ming Chiao Tung University. Through ongoing bilateral visits, we are strengthening existing partnerships, nurturing innovative prospects, and creating more opportunities for academic exchange, research advancement, and corporate innovation between the two universities to enhance international ties.

透視羽球 - 控球力評估系統

文／鍾乙君

在運動科技發展方興未艾之際，易志偉教授研究團隊自2019年即投入精準運動科技領域研究。近期易志偉教授研究團隊利用先進的立體攝影技術和電腦視覺技術來追蹤羽球軌跡，創造出以提供科學化的表現數據，提升場館使用者的體驗並增加運動學習效率和娛樂性的「拍拍表現紀錄系統」。易志偉教授研究團隊「拍拍表現紀錄系統」榮獲2023 未來科技獎，肯定研究團隊卓越貢獻。

在羽球運動中，評估球員表現的重要指標之一是每拍擊球表現指標，包括出球 速、出球角和球種使用等。基於這個理念，易志偉團隊的研究目標是開發一套適用於智慧球館的個別羽球表現紀錄系統。

「拍拍表現紀錄系統」涉及了專業運動場地的建設和運作，能夠利用先進的立體攝影技術和電腦視覺技術來追蹤羽球軌跡，以提供科學化的表現數據，提升場館使用者的體驗，增加運動學習效率和娛樂性。該系統主要由四個部分組成，首先是立體攝影系統，它由多台同步高速攝影機組成，能夠以多視角同步錄製比分對打的畫面。這種立體攝影技術不僅能夠捕捉球員的擊球姿態，還能夠提供更全面和詳細的羽球軌跡資訊。

此外，「拍拍表現紀錄系統」還具備相機內外部參數計算等功能，以確保錄製到的影像資料的準確性和可靠性。其次是羽球的 2D/3D 軌跡計算部分。該部分使用深度學習技術來追蹤 2D 羽球軌跡，然後利用攝影幾何原理計算出 3D 軌跡。使得系統能夠以更高的精確度來重建球的運動軌跡，並且在不同角度和距離下都能夠準確地測量出球的位置和運動軌跡。

而羽球軌跡的語意解析部分則利用 3D 軌跡來檢測擊球事件，並對軌跡進行分段和平滑化處理。通過對球的運動軌跡進行詳細分析，系統便能夠自動標記出球的起始點、軌跡變化以及終點等關鍵事件，同時還能夠消除由於偵測錯誤計算所引起的軌跡偏差，提供更精確和可靠的球的運動軌跡資訊。

最後是對於球員最重要的擊球表現數據計算，該部分根據 3D 軌跡提取拍拍表現數據，以列表的形式呈現。收集的數據包括出球速度、出球角度和使用的球種等關鍵指標，能夠提供球員和教練在分析和評估球技表現時所需的重要參考資料。同時，「拍拍表現紀錄系統」還提供了 3D 軌跡的視覺化功能，以直觀和生動的方式展示球的運動軌跡，幫助球員更好地理解和分析自己的擊球技術。

這套系統不僅能夠提供精確且全面的羽球擊球表現紀錄，幫助球員和教練更好地了解球技表現、發現長處和改善之處，同時還能夠為觀眾和球迷提供更豐富的觀賞體驗，深入了解羽球運動。該系統的應用潛力廣泛，不僅可以應用於智慧球館，還可以用於訓練場地和比賽場地，提升羽球運動的品質和競爭力。

因此，易志偉教授的研究成果不僅能夠促進智能化技術的應用和發展，更能夠推動運動科學的進步和運動體驗的提升，成為當代科技界的典範。在此，再次祝賀易志偉教授獲得未來科技獎，也期待他的團隊在科研道路上的能為體育項目智能化有更多精彩的研究成果，取得更多重大突破和成就！

Insight into Badminton – Control Ability Evaluation System

At the flourishing development of sports technology, Dr. Chih-Wei Yi and his research team have been dedicated to precision sports technology research since 2019.Recently, Dr. Yi s research team developed a shot-by-shot performance evaluation system for smart courts. They utilized advanced stereoscopic photography and computer vision technology to track badminton trajectories and generate scientific data. With outstanding contributions from this team, Professor Yi's research team was honored with the 2023 Future Technology Award for their Shot-by-Shot Performance Evaluation System.

In badminton, one of the crucial performance indicators is the performance of each racket hitting the shuttlecock, including the speed of the shot, the angle of the shot, and the type of shot used. Therefore, Professor Yi's team aimed to develop an individual badminton performance recording system suitable for smart badminton courts. The Shot-by-Shot Performance Evaluation System incorporates the construction and operation of professional sports venues when tracing badminton trajectories with technology. By providing scientific performance data, it can enhance the user experience of venues, increase the efficiency of learning, and improve the overall entertainment experience. The system consists of four main parts. The stereoscopic photography system, composed of multiple synchronized high-speed cameras, is capable of recording rallies from multiple angles simultaneously. This technology not only captures the player's hitting posture but also provides comprehensive and detailed information about the badminton trajectory.

Besides, the system has functions such as calculating internal and external parameters of the cameras to ensure the accuracy and reliability of the recorded image data. The 2D/3D trajectory calculation of the badminton shuttlecock tracks the 2D trajectory first and then calculates the 3D trajectory using deep learning technology and the principles of photographic geometry. This enables the system to reconstruct the shuttlecock's motion trajectory with higher precision and accurately measure its position and movement from various angles and distances. The semantic analysis of the badminton trajectory utilizes the 3D trajectory to detect hitting events. Also, it can segment and smooth the trajectory. By conducting a detailed analysis of the trajectory, the system can automatically identify key events, including the starting point, trajectory changes, and endpoint of the shuttlecock. It also mitigates trajectory deviations caused by detection errors. Fundamentally, this allows the system to furnish more accurate and reliable information about the shuttlecock's motion trajectory. Finally, the calculation of player performance data, which extracts performance data from the 3D trajectory, is presented in tabular form. The collected data include key indicators such as shot speed, shot angle, and the type of shot used, providing reference for players and coaches in analyzing and evaluating their skills. The Shot-by-Shot Performance Evaluation System can help players better understand and analyze their hitting techniques, as the shuttlecock's 3D motion trajectory can be vividly and intuitively presented through the visualization feature.

This system provides accurate and comprehensive records of badminton hitting performance to help players and coaches better understand strengths and areas for improvement. Additionally, it enhances the viewing experience for the audience during games. The application of this system also extends to athlete training in venues, improving competitiveness in badminton competitions for players. Therefore, Dr. Yi s research achievements not only promote the application and development of intelligent technology but also drive the advancement of sports science and the enhancement of sports experiences. His significant contributions have made him a role model in the field of computer science. Congratulations to Dr. Chih-Wei Yi once again for receiving the Future Technology Award, and we look forward to more brilliant research results from his team in the field of intelligent sports technology.

黃敬群教授之空位偵測研究 自動智慧停車塲智慧再升級！

文／杜懿洵

所謂智慧型運輸系統(Intelligent Transportation System , ITS)，是指利用先進之電子、通信、電腦、控制及感測等技術，於各種運輸系統 (尤指陸上運輸)，透過即時資訊傳輸，以增進安全、效率與服務，改善交通問題。台灣地狹人稠，高度集中發展的都市化區域，因為「停車一位難求」而衍生的違規停放、交通壅塞、空污加劇等亂象，使得「智慧停車」相關解決方案，成為智慧運輸系統中最為熱門的應用。

一般可將智慧停車管理系統分為閘門管制、（車位）在席偵測、收費／支付及後端管理四大塊，近年來最多的應用以在席偵測技術的選擇為主；而以停車格在席偵測技術而言，一般以「影像辨識法」、「偵測器法」兩種為主要大宗。影像辨識方面，通常有路口高架攝影機與地面架設攝影機立柱兩種方案，但後者會遇到「架設成本高」、「地權問題」（若是將智慧立柱安裝在地面上需要確認土地是否為私人產權），以及對於「隱私問題」的相關顧慮等挑戰。至於採用偵測器方式蒐集資料，也存在著「需與勞務業者配合才能辨識車主身份」、「仰賴電信公司通訊架構成熟度」，以及「偵測器對於環境的耐受度與天線設計的通訊品質」等問題，因此，高位攝影機在席偵測方法逐漸受到廠商的青睞，也成為政府近期試辦的主流智慧停車服務。

本校資工系黃敬群教授長期進行智慧停車空位偵測相關研究，其運用 AI 與視訊演算法所研發的影像辨識服務，不但克服了白天、夜晚、陰天、下雨天、大太陽等諸多戶外場景狀況，更讓單一攝影機就能拍攝涵蓋停車場 60~70 個停車位，不但解決了傳統影像辨識設置成本極高（每個停車格皆需設立智慧車柱）的問題，大幅提高服務系統的經濟價值，架設於高位的攝影機也不會產生地權問題；而由於攝影設備只針對車輛區塊區拍攝，不會照到人或環境，留存影像也僅有車輛跟車牌，所以也不會造成侵犯隱私問題的疑慮。

黃敬群教授將研究成果與專業停車場管理廠商「歐特儀」股份有限公司進行合作，研發出擁有強大後端運算能力的「高位攝影開單系統」，只要在路燈上架設高位攝影機，系統透過影像串流方式，從偵測拍照、即時 AI 演算、到辨識車牌或干擾物、甚至開單、離場、系統異常、影像存留等，全部都可以自動化作業。

此高位攝影開單系統，今年分別與和台北市政府、新竹市政府合作進行「高位攝影智慧化開單服務」與「影像智慧停車柱」的試辦應用，不但成為台北市試辦的第三種路邊停車智慧開單服務，「影像智慧停車柱」也成為新竹市公有停車場首創的自動智慧停車服務。

根據台北市停管處表示，從 7 月 17 日到 9 月 30 日，在台北市中正區潮州街（羅斯福路 1 段至杭州南路 2 段）16 格路邊停車停車格試辦第 3 種智慧停車服務：「高位攝影智慧化開單服務」，此項設備具影像辨識及車輛感測功能，除了可偵測車輛入停、提供即時停車格位資訊之外，還能自動開單，民眾不會收到停車費開單，只要在車輛駛離停車位 10 分鐘之後，就能透過手機於智慧支付平台查繳，或至四大超商多媒體機列印繳費單櫃檯繳費、綁定銀行、電信業者代扣繳等方式繳費，實現真正的無人化、無紙化智慧停車與開單服務。目前經北市府評估成效良好，將陸續擴大到 160 格。

相對於台北市於「路邊停車格」試辦智慧停車服務，新竹市交通處此次是選擇在東區區公所停車場，啟用「影像智慧停車柱」服務。

新竹市自 2019 年起便積極建置智慧停車系統，陸續在 9 處公有停車場，以代幣與自動柵欄建置無人自動化的車輛進出管理系統；為使服務更升級，此次啟用全市首創的的影像智慧停車柱，利用車牌辨識技術，結合自動停車收費系統，停車場無柵欄也無需取代幣，車輛進出無需停留，離場前到收費亭按壓車牌號碼繳費後即可離場，或可於期限內至超商或以第三方支付繳納，讓使用者輕鬆停車、簡單繳費、快速離場，停車省時、方便性升級！

戶外情境相當複雜，除了天候外，大型車遮蔽、用路人行為等，都影響了電腦視覺與深度學習辨識技術的正確性，黃敬群教授的空位偵測研究應用，與廠商攜手合作，攻克戶外場域干擾問題，透過前背景的渲染專利，讓系統的可靠度達商轉的條件，讓智慧停車服務技術邁入了全新的里程碑，停車與繳費能正式進入完全無人化與無紙化的智慧服務，也期待此次於台北市與新竹市的試辦能成為智為城市重要一環，並持續累積有用的數據資料，進一步推升未來智慧停車科技的相關研究工作！

Smart Parking System Based on

Professor Ching-Chun Huang's Vacancy Detection Research

The term "Intelligent Transportation System (ITS)" denotes the utilization of cutting-edge technologies, encompassing electronics, communication, computers, control systems, and sensors, across different transportation networks, with a particular focus on land transportation. This seamless integration of advanced technology empowers the enhancement of safety, efficiency, and service quality through real-time data transmission to tackle multifaceted traffic challenges. In Taiwan, the nation's constrained geographical landscape and high population density have given rise to issues such as unauthorized parking, traffic congestion, and increased air pollution due to the scarcity of parking spaces. Consequently, solutions for "smart parking" have emerged as one of the most widely embraced applications within the field of intelligent transportation systems.

In general, smart parking management systems typically consist of four main components: gate control, parking space detection, payment processing, and backend management. In recent years, the primary focus has been on advancing parking space detection technology. When it comes to detecting parking space occupancy, two primary methods are commonly employed: "image recognition" and "sensor-based" techniques. Regarding image recognition, there are typically two options: overhead cameras at intersections and ground-mounted camera pillars. However, the latter approach faces challenges such as costly installation, property rights issues (particularly when securing the necessary land ownership verifications for ground-based smart pillars), and privacy concerns. On the other hand, the utilization of sensor-based methods for data collection gives rise to a set of complexities in terms of 'coordination with service providers to identify vehicle owner,' 'dependence on the maturity of telecommunications infrastructure provided by telecom companies,' and 'the sensor durability in various environmental conditions and the quality of antenna design for communication.' As a result, high-position cameras for parking space detection have garnered increasing favor among manufacturers and have emerged as the primary choice in recent government trials of smart parking services.

Professor Ching-Chun Huang, from the Department of Computer Science at NYCU, has conducted extensive research on smart parking space detection. Through the use of AI and video algorithms, he has developed an image recognition service that not only effectively addresses various outdoor conditions such as daytime, nighttime, overcast weather, rainy conditions, and bright sunlight but also allows a single camera to efficiently cover 60 to 70 parking spaces within a parking lot. This innovation addresses the challenge of the usually high costs linked to conventional image recognition setups, which demand the installation of smart pillars for each parking space. This significantly enhances the economic value of the entire service system. Additionally, the use of high-position cameras addresses concerns about property rights. These cameras specifically focus on the vehicle area without capturing individuals or the surrounding environment. As a result, the saved images include only vehicles and license plates, thereby alleviating concerns about privacy infringements.

Professor Huang is partnering with the professional parking management company 'Altob Inc.' to bring forth an advanced 'high-position camera-based ticketing system' featuring robust backend computing capabilities. By simple deployment of high-position cameras mounted on lampposts, this system will employ a video streaming approach to automate operations, such as detecting photography, real-time AI algorithms, license plate recognition, interference detection, ticket generation, exit management, handling system anomalies, and image storage.

The high-position photography ticketing system has collaborated with both the Taipei City Government and the Hsinchu City Government this year to conduct trial runs for the 'high-position photography smart ticketing services' and 'image smart parking pillars.' It emerged as the third type of smart on-street parking ticketing service in Taipei City's trial, while it also pioneered automated smart parking services in public parking lots in Hsinchu City.

The Taipei City Parking Management Office conducted a trial of the third type of smart parking service, known as the "high-position photography smart ticketing service," from July 17 to September 30. The trial took place on the 16 on-street parking spaces along Chaozhou St. in Zhongzheng Dist., Taipei City, spanning from Sec. 1, Roosevelt Rd., to Sec. 2, Hangzhou S. Rd. The innovative system is equipped with image recognition and vehicle sensing functions. In addition to detecting vehicle entry and providing real-time parking space information, it also has the capability to automatically issue tickets. Instead of receiving parking fee tickets, users can check payment options for parking fees on their mobile phones within 10 minutes after the vehicle leaves the parking space. These options include paying via their mobile phones on the smart payment platform, printing payment slips at multimedia kiosks in major convenience stores and making payments in-store, linking payments with banks, or enabling auto-debit of telecom service providers. This advancement signifies a genuinely unmanned and paperless smart parking and ticketing service. The current success, as evaluated by the Taipei City government, will lead to a gradual expansion to cover 160 parking spaces.

Compared to Taipei City's trial of smart parking service for "on-street parking spaces," Hsinchu City Government Department of Transportation has opted to introduce the "Smart Parking Pillars" service at the Hsinchu Eastern District Office parking lot.

Starting from 2019, Hsinchu City has actively established a smart parking system. An unmanned automated system for managing vehicle entry and exit has been implemented, utilizing tokens and automatic barriers, in nine public parking lots. To further elevate the service, the city has introduced a groundbreaking image smart parking pillar. By incorporating license plate recognition technology and integrating an automated parking fee system, the parking lots no longer rely on barriers or token usage. Vehicles can smoothly enter and exit without the need to come to a halt, and users can easily input their license plate number at the payment kiosk before departing. Alternatively, payments can be swiftly settled at convenience stores or through third-party payment platforms within the specified timeframe. This work flow streamlines the parking process, simplifies payment, and facilitates a quick exit, ultimately saving users time and significantly enhancing convenience!

The outdoor setting poses numerous challenges, including factors such as weather, large vehicles blocking the view, and pedestrian behavior, all of which impact the precision of computer vision and deep learning recognition technology. Professor Huang's collaborative research on parking space detection, in partnership with manufacturers, has successfully addressed interference issues in outdoor environments. Leveraging patented technology, the system's reliability now meets commercial standards, marking a significant advancement in smart parking service technology. This application facilitates the formal transition of parking and payment processes into fully automated and paperless smart services. With the anticipation that the trials in Taipei and Hsinchu will play pivotal roles in smart cities, we look forward to accumulating valuable data and contributing to the ongoing progress of research in smart parking technologies in the future!

曾意儒教授：勇敢踏出舒適圈，投身醫學與資訊跨領域

文／鍾乙君

本次專訪非常榮幸能夠邀請到本院資訊工程學系的曾意儒副教授，他在資料科學、機器學習、生醫資訊和臨床決策支援系統等領域具有專業知識。曾意儒教授不僅帶領著本校數位健康實驗室，在跨領域研究上也表現出了非凡的熱情。此次將深入探討曾副教授在醫學與資訊工程跨領域上的學習和職涯規劃，同時探討他的研究背景以及對於教學的想法和經驗。在當今社會對於斜槓人才和多元能力的需求日益增長的背景下，我們希望曾意儒教授的故事可以為資工系學生提供新的思路和啟示。

跨越學門界限追尋夢想，為社會帶來更大的價值

曾意儒副教授的背景與資訊院裡資訊工程出身的教授不同，他大學畢業於醫學檢驗暨生物技術學系。該學系培養學生成為於醫院服務的醫檢師或生物科技相關研究人員。然而，在他實習的過程中，曾教授注意到醫院內部的系統過於陳舊，與時代潮流背道而馳。於是，曾教授開始思考醫院與資訊工作者是否能合作並改變醫院現況。因此，在考慮要攻讀研究所時，他決定轉進生醫資訊領域，橫跨兩個專業領域語言的壁壘尋找結合的可能性。曾副教授就此踏上了學習生醫資訊相關知識的旅程，也逐漸在這個領域裡找到人生的志向，基於對持續學習的渴望最後他決定攻讀博士學位，持續研究工作到今日。

在問到曾副教授在哈佛醫學院的經驗時，他認為這段經歷帶給自己許多新奇的體驗以及在台灣接觸不到的機會，拓展了自己的眼界。「我個人過去的經驗比較少遇到這樣的人，就是會支持你想要做的事，他也會適時的跟你說他覺得比較對的方向，大家也都滿熱烈的在討論研究的內容，然後做到一半的事情也都不怕分享，也不會怕會被誰批評，反正大家都是希望把事情做到最好。」曾副教授很欣賞這種鼓勵探索的態度，而這段經歷也讓他認識了很多志同道合的人，之後也保持著合作關係。此外，生醫資訊領域較有名的期刊其實對美國的資料都比較有興趣，透過這個管道他也可以一直分析美國比較有趣的資料，這為他提供了更多的發表和發展機會。在國外的這段時間，除了學術上的成長外，他還培養了一種截然不同的工作態度，並為未來的發展鋪平了道路。

培養自學能力：創新教學方法的突破

回國後，走向教職的曾副教授對於教學模式有一番領悟。身為教授，但他其實從未受過教師培訓，卻需要負責了學生們的教育。他坦言過去上課時，只是模仿自己老師教學的方式來教學生，不知道其他人的上學經驗如何。後來曾副教授輾轉換了幾所學校，他漸漸體認到不同的學生需要不同的教學方法。有些學生對讀書並不熱愛，也不擅長考試，如果繼續用傳統的教學方式，那也只會將他們推向絕境。

因此，曾副教授試圖讓那些對考試和學習感到不自在的人對學習產生興趣。在後來的課堂上，他嘗試使用了創新的教學方法，例如翻轉教室。對曾副教授來講，他關注的是如何培養他們的自學能力，引導他們自主學習，並且與學生站在同一陣線。

You’ve got nothing to lose ！給自己多一點時間

「每當我與跨領域的學生交談時，我總會告訴他們：你在第一年可能會感到有些失落，覺得自己好像什麼都不會，而別人卻已掌握得滾瓜爛熟。給自己多一點時間。如果一年後你仍然感到痛苦，那我們再討論是否轉換跑道，但我認為你需要給自己一年的時間來嘗試。」在跨領域方面，他認為“無所懼失”(Nothing to lose) 這句話很重要。他也希望學生能理解，如果你想做某件事，就去追求它，並不會有什麼損失。

於訪談結束之際，曾副教授也提到，對從事醫學資訊的人來說，他保持樂觀的態度期待未來有更多生醫資訊的跨域合作機會。他認為現在機會變得更多，但仍然需要自己去爭取，醫學和資訊領域仍然存在差異，因此期許能夠理解兩者對話的人增加，為社會進步盡一份力。對於當今追求斜槓與多面能力的社會而言，曾意儒副教授的故事充滿啟發性。他的經歷向我們展示了專業知識和創新思維的結合，並告訴我們只要有足夠的準備，我們可以超越學科界限，追尋自己的夢想，為社會帶來更大的價值。在曾意儒副教授的鼓勵與分享後，相信資工系的學子們將開啟一條通往未來的新道路，為自己的將來思考更多的可能性。

Professor Yi-Ju Tseng: Be Brave and Step outside of Your Comfort Zone to Engage Yourself in the Interdisciplinarity of Medical and Information

In this interview, we are honored to welcome Associate Professor Yi-Ju Tseng from the Department of Computer Science at our college. His areas of expertise encompass data science, machine learning, biomedical informatics, and clinical decision support systems. Professor Tseng not only heads our university's Digital Health Laboratory but also exhibits a remarkable passion for interdisciplinary research. On this occasion, we will explore his academic journey and career development, spanning the interdisciplinary fields of medicine and information. Furthermore, we will delve into his research background and gain insights into his perspectives and experiences related to teaching. Given the increasing demand for individuals with versatile abilities and a wide range of skills in modern society, we hope that Professor Tseng's story can offer fresh perspectives and inspiration to students in the Department of Computer Science.

Pursuing dreams beyond the boundaries of academic disciplines in order to contribute enhanced value to society.

Professor Tseng's academic background differs from that of the faculty members in the College of Computer Science, as he earned his degree from the Department of Clinical Laboratory Sciences and Medical Biotechnology. This department specializes in equipping students for careers as clinical laboratory scientists in hospitals or as researchers in the biotechnology field. During his internship, Professor Tseng noticed that the hospital's internal systems were outdated, lagging far behind contemporary standards. Consequently, he began contemplating the possibility of collaborating with IT experts to improve the hospital's current situation. Therefore, when considering pursuing graduate studies, he made the decision to transition into the field of biomedical informatics, seeking the potential of combining two different professional domains. Professor Tseng set out on a quest to gain expertise in biomedical informatics and slowly discovered his true calling in this field. Motivated by a strong desire for continuous learning, he ultimately decided to pursue a doctoral degree, carrying forward his research work to the present day.

When inquired about his experience at Harvard Medical School, he expressed that this phase of his life brought him numerous unique experiences and opportunities that were unavailable in Taiwan, thus broadening his horizons. In my prior experiences, I encountered fewer individuals that not only offered unwavering support for my work but also provided timely guidance towards what they believed could be a more favorable direction. Furthermore, there was a palpable enthusiasm among the team for discussing research topics, and no one hesitated to share their work even if it was still in progress. Critique was also embraced, as everyone held the same faith of striving for excellence. Professor Tseng sincerely appreciates this spirit of exploration. Moreover, this experience has facilitated his connection with numerous individuals with similar goals, with whom he has maintained collaborative relationships. Furthermore, due to the heightened interest of prestigious biomedical informatics journals in U.S. data, this channel helps him delve into more captivating datasets from the U.S., opening up additional prospects for publication and career advancement. While abroad, he not only experienced academic development but also cultivated an entirely new work attitude, laying the foundation for his future progress.

Nurturing Self-Learning Skills: An Innovation in Teaching Methods

Upon returning to Taiwan, Professor Tseng gleaned valuable insights into the teaching model as he transitioned into the role of an educator. Although he held the position of a professor, he had never undergone formal teacher training, yet he carried the responsibility of instructing students. He readily admitted that in his prior teaching experiences, he had simply replicated the teaching methods of his own instructors without fully understanding others' perspectives. Subsequently, he switched the teaching positions among schools several times and gradually recognized the need for various teaching approaches tailored to different students. Certain students lacked enthusiasm for studying and struggled to perform well in exams. If the instructor persisted with traditional teaching methods, it would only lead them further into a sense of hopelessness.

Therefore, Professor Tseng attempted to ignite a passion for learning in students who were uneasy about exams and studying. In subsequent classes, he explored innovative teaching approaches such as flipped classrooms. His primary emphasis revolved around cultivating students' self-directed learning skills, steering them towards independent learning, and aligning himself with the students.

You've got nothing to lose! Give yourself a little more time.

Whenever I speak with students pursuing interdisciplinary studies, I consistently offer them this advice. During your first year, it's quite common to experience a sense of confusion, feeling like you lack knowledge while others seem to have it all together. My suggestion is to give yourself some additional time. If, after a year, you still find yourself in distress, we can then investigate the strategy of altering your route. However, I firmly believe that allowing yourself a year to explore is essential. Regarding interdisciplinary studies, he emphasizes the significance of the phrase 'Nothing to lose.' He hopes that students can realize that if they want to pursue something, they should go for it, and there won't be much to lose.

At the end of the interview, Professor Tseng also mentioned his optimism and anticipation for increased interdisciplinary collaboration opportunities in the field of biomedical informatics, particularly for those who are engaged in Medical Informatics. He maintains the belief that while there may be more opportunities available currently, one must still actively strive for them. Recognizing the existing disparities between the fields of medicine and information, he hopes that a greater number of individuals will bridge the gap between the two fields to actively contribute to social advancement. In today's society which highly esteems adaptability and diverse skill sets, Professor Tseng's story indeed inspires all of us. His experience illustrates the synergy of expertise and innovative thinking, validating the notion that through meticulous preparation, we can transcend the boundaries of our respective fields, pursue our ambitions, and create greater value for society. Motivated by Professor Yi-Ju Tseng's guidance and wisdom, we have faith that students in the Department of Computer Science will chart a new course and explore a multitude of possibilities for their futures.

4.8. 交大日 歡慶系友回娘家

文／鍾乙君

2023 年 4 月 8 日為國立陽明交通大學交大日，本院資工系隆重盛大舉辦系友回娘家活動，這一天，不僅眾人共襄盛舉，更重聚了一群凝聚力超強的資工系友，共同追憶往昔，展望未來。

首先迎來了計算機工程學系 69 級聯強國際 (股) 公司集團副總裁暨發言人杜書全學長與計算機工程學系 73 級廣達電腦執行副總經理蔡文弘兩位 112 年度本系傑出校友的致詞。

杜書全學長用自身在業界打拼多年的經驗提醒在學的學弟妹，在 AI 議題與科技蓬勃發展的現今，過去有所侷限的資訊科學領域有了新的舞台等著被探索，而電腦工程可以應用到所有的事情。所以在眼前無限擴張的領域底下，學好基本擴張自己所能觸及的範圍是最重要的。而蔡文弘學長則一上台便打趣說自己是傑出校友裡面最「正常」的得主，他歷經過無數次的失敗，而先前的傑出校友卻都是看來如此順遂的成功。於是他提到大眾眼裡成功人士的倖存者偏差，人們常常只看到部分人成功的一面，卻不知其成功背後的故事。蔡學長以自身經歷提醒學弟妹的是一個成功人士的失敗經驗遠比他的成功經驗來的有價值，沒有多少人能夠一步登天，卻有人能從深淵裡爬出來。

兩位皆以豐富的經驗和深厚的學術造詣，分享了他們在資工領域的成長和心得。他們勵志的話語中也透露著對母校的感激之情，也激勵著在場的每一位系友，繼續追求卓越。

活動的重頭戲之一是 112 年度傑出系友頒獎典禮。資工系今年選出 9 位傑出系友，分別是卞志祥學長（現任台灣微軟總經理）、李益青學長（現任聯發科技資訊工程本部總經理暨安全長）、周建隆學長（現任台灣期貨交易所總經理）、逄愛君學姐（現任、國立台灣大學資科工所特聘教授）、徐宏民學長（現任國立台灣大學資訊工程學系教授與富智捷副總經理暨技術長）、馮震宇學長（現任和碩聯合科技第六事業群總經理）、許順宗學長（現任尊博科技股份有限公司執行董事）、賈仲雍學長（現任中華電信網路技術分公司副總經理）以及魏煥雲學長（現任利基網路與迅捷系統總經理）。他們以自己的努力和才華，在跨領域科技、5G 應用、科技轉型以及永續經營等等各自的領域取得了傑出的成就，如此的成果不只為資工學院的所有後輩樹立榜樣，也是建立了倚靠自身知識為台灣社會向新未來邁進的里程碑，值得敬佩與學習。

隨後，系友會邱繼弘會長上台致詞。邱繼弘會長回顧系友會成立以來的歷程和所做的努力，並強調系友之間的強大連結和支持的重要性。同時，這種團結和合作的精神，正是資工系所特有的凝聚力的體現。其次，在幫助母校的方面，他也特別感謝訊舟科技捐助 EDIMAX x NCTU Design Space、79 級學長姐捐贈機房、計工 70 級陳尚仁學長提供遠端監控與自動管理設備與奧圖碼股份有限公司捐贈 86 吋互動式觸控螢幕一台與智慧教室軟體解決等，再次感謝系友們為資訊學院創造更優質的環境，以培育更多優秀的學生。

緊接在後的接棒上場的是傑出系友黃耀文學長，黃學長最為人熟知的不只是阿碼科技與 XREX 的共同創辦人，更是一位天使投資人、區塊鏈與加密貨幣研究者與資安專家。在區塊鏈有所建樹的學長以他在區塊鏈金融領域的經驗， 為我們帶來了一場關於區塊鏈在新興市場實際應用的精彩講座。他的分享帶領台下的聽眾們深入了解了區塊鏈技術的發展趨勢和潛力，引發了許多有趣的討論和思考。

在講座結束後，黃俊龍系主任和曾建超副院長分享了關於系友與系務發展的重要訊息。他們詳細介紹了系務自動化系統和計算機網路管理等課程，並強調了與產業合作的重要性。這樣的合作不僅能夠讓學生在校園外獲得實際經驗，也有助於提升資工系的教學品質和專業水平。

回顧這次資工系友回娘家的活動，我們不僅度過了一個充滿溫情和回憶的日 子，更展現了陽明交大資工系凝聚力超強的校友之家的獨特魅力。在這裡，我們不僅分享著成就和經驗，更共同承擔著母校的發展和未來的使命。陽明交大資工系的精心籌劃和安排源於一片對資訊院先進的尊敬也是對後進的提攜的熱心，讓我們能夠重聚於此，再次感受到這個大家庭的溫暖和力量。未來期待著更多的相聚和合作，繼續攜手共同追求卓越，為資工領域的發展做出更大的貢獻。

2023 NYCU Anniversary Celebration and Alumni Reunion

The National Yang Ming Chiao Tung University (NYCU) Anniversary Celebration Day, scheduled for April 8, provided the perfect opportunity for the College of Computer Science (CCS) to host Homecoming Day 2023. This event brought together a multitude of people for celebration and reunited a highly cohesive group of CCS alumni, enabling them to reminisce about the past, embrace the present, and look forward to the future together.

At first, we had the honor of receiving speeches from two distinguished alumni of the Department of Computer Engineering: Mr. Shu-Chyuan Tu, Class of 69, Vice President and Spokesperson of Synnex Technology International Corporation, and Mr. Wen-Hong Tsai, Class of 73, Executive Vice President of Quanta Computer Inc. They delivered speeches as outstanding departmental alumni during the 112th academic year.

Having accumulated numerous years of industry experience, Shu-Chyuan Tu, as an alumnus, emphasized to the current students the burgeoning opportunities in the modern landscape of AI and technological advancement. Information science, once constrained, now offers new avenues for exploration, and the applicability of computer engineering is nearly limitless. Therefore, it is important to master the fundamentals and expand one's horizons in this rapidly evolving field. When Wen-Hong Tsai stepped onto the stage, he humorously declared himself the 'most ordinary' among the distinguished alumni. He had faced numerous setbacks, in contrast to the previous outstanding alumni who seemed to have effortlessly achieved success. He astutely highlighted the survivorship bias that often skews public perception of successful individuals. Often, people only see the triumphant aspects of a select few without delving into the stories that underlie their success. Tsai drew from his own experiences to emphasize to students that the lessons learned from failures in the journey of a successful person hold far more significance than their triumphs. Not many people can achieve instant success, but there are those who can emerge from the depths of adversity.

With their wealth of experience and profound academic achievements, they both shared their journeys of growth and insights in the field of information technology. Their motivating speeches also conveyed heartfelt gratitude to their alma mater, inspiring all the attending fellow alumni to persist in their pursuit of excellence.

One of the highlights of the event was the ceremony of the 2023 Distinguished Alumni Awards. The Department of Computer Science recognized and honored nine outstanding alumni for this year, namely Jyh-Shang Pien (currently the General Manager of Microsoft Taiwan), Yi-Qing Li (currently the General Manager and Chief Information Security Officer at MediaTek Inc.), Chien-Lung Jou (currently the General Manager of Taiwan Futures Exchange), Ai-Chun Pang (currently a Distinguished Professor, Institute of Computer Science and Information Engineering at National Taiwan University), Winston Hsu (currently a professor in the Department of Computer Science and Information Engineering at National Taiwan University and Deputy General Manager and Chief Technology Officer at MobileDrive), Chen-Yu Feng (currently the General Manager of the Sixth Business Group at PEGATRON Corporation), Shun-Tsung Hsu (currently an Executive Director at Jumbo Technology Co.), Chung-Yung Chia (currently the Deputy General Manager of the Network Technology Division at Chunghwa Telecom), and Huan-Yun Wei (currently the General Manager of L7 Networks Inc.). Thanks to their unwavering commitment and exceptional skills, they have attained remarkable success across a spectrum of domains, spanning interdisciplinary technology, 5G applications, technology transformation, and sustainable business. Their accomplishments not only serve as inspiring examples for the students in the Department of Computer Science but also represent a notable milestone in the advancement of Taiwanese society toward a brighter future through their expertise. Their achievements are indeed commendable and offer valuable insights for everyone.

Subsequently, President Nathan Chiu of the alumni association stepped onto the stage to deliver a speech. During his address, President Chiu provided an overview of the alumni association's journey and its dedicated efforts since its inception, underscoring the significance of the strong bonds and support network fostered among the alumni. This sense of unity and collaboration, he noted, reflects the distinct cohesiveness found within the Department of Computer Science. When it came to supporting their alma mater, he extended his special gratitude to Edimax Technology Co. for their generous donation of the EDIMAX x NCTU Design Space, the alumni (Class of 79) for their contribution of an Internet Data Center, alumnus Shang-Ren Chen (Class of 70) for offering remote monitoring and management equipment, and Optoma Corporation for gifting a smart classroom solution featuring an 86-inch interactive touchscreen. Once more, he expressed deep appreciation to the alumni for their efforts in enhancing the educational environment of the College of Computer Science and nurturing the development of outstanding students.

Following Chiu's speech, the focus shifted to the Distinguished Alumnus, Wayne Huang. Huang stands not only as the co-founder of Armorize Technologies and XREX but also as an esteemed angel investor, a distinguished researcher in blockchain and cryptocurrency, and a cybersecurity expert. He, who has made substantial contributions to the field of blockchain finance, delivered an enlightening lecture on the practical applications of blockchain technology within emerging markets. His presentation illuminated the developme nt trends and immense potential of blockchain technology, providing the audience with a profound understanding of the evolution and possibilities within the blockchain field. This, in turn, ignited stimulating discussions and contemplation among the attendees.

After the lecture concluded, Chairman Jiun-Long Huang and Associate Dean Chien-Chao Tseng shared important information about alumni and departmental development. They delivered a comprehensive exposition on the department's automated systems and courses related to computer network management. Concurrently, they emphasized the significance of collaboration with industry partners, which not only offers students opportunities to gain real-world experience beyond the campus but also plays a pivotal role in elevating the quality of education and professional standards within the Department of Computer Science.

Looking back on this CS alumni homecoming event, we not only experienced a day brimming with warmth and treasured memories but also highlighted the exceptional charm of the tightly connected alumni network within the Department of Computer Science at NYCU. At this gathering, we exchange our accomplishments and experiences as well as come together to shoulder the responsibility for the advancement and future of our beloved alma mater. The detailed preparations and arrangements by the Department of Computer Science stem from deep respect for our esteemed alumni and a steadfast dedication to nurturing the next generation. This reunion has brought us back together, enabling us to savor the warmth and unity of this extended family once more. We eagerly anticipate more gatherings and collaborations in the future, pledging to persistently work together in our unwavering quest for excellence and to make even more significant contributions to the field of computer science.

人工智慧的啟示

文／林一平 講座教授

圖靈獎（Turing Award）得主 Geoffrey Hinton 在日前公開討論人工智慧（AI）的風險。

AI「往往會從分析大量數據中學到意想不到的行為」。這並非意味著具有自主意識的 AI 會摧毀人類，而是我們無法預測 AI 的行為，特別是當個人和企業允許 AI 系統不僅生成其自身的代碼，而且在自己的計算機上運行這些程序時，Hinton 擔心「有一天，真正的自主武器將那些殺手機器人變成現實」。

第一個實際的 AI 系統是由 Edward Feigenbaum 及 Raj Reddy 實現，稱為「專家系統」，是一種智慧型的電腦程序，能運用知識與推論來解決只有專家才能解決的複雜問題；他們也因此一貢獻榮獲 1994 年的圖靈獎。

然而，許多系統需要模擬的參數甚多，至今仍然無解。可見計算機模擬的應用博大精深，即使今日 AI 技術突飛猛進，有許多題目仍值得深入研究。

圖　靈（Alan Turing，1912~1954）　在 1950 年發表一篇重要論文〈計算機與智慧〉"Computing Machinery and Intelligence"，首次談論到 AI，並提出圖靈測試（Turing test），為資訊領域創建智慧設計的標竿。

圖靈測試指的是，如果一台計算機能夠欺騙人類， 相信它是人類，那麼它就應該稱為智能計算機。AI 緣起於模擬人類行為，自然也常用於社會學。

密西根大學的政治學教授 Robert Axelrod，在 1980 年代進行一連串電腦模擬實驗，找一群專家寫出不同電腦程式，模擬人類行為，讓這些程式互動、合縱連橫，看哪個程式最後會勝出。這些程式有些模擬「金律」，有些模擬「銀律」，有些則模擬「鐵律」。

所謂「金律」（Golden Rule），語出《新約》< 馬太福音 >7:12「無論何事、你們願意人怎樣待你們、你們也要怎樣待人」；「銀律」（Silver Rule），語出《舊約》< 出埃及記 >21:24「以眼還眼，以牙還牙，以手還手，以腳還腳」；「鐵律」就是「己所不欲，先施於人」，外在表現是「先下手為強，後下手遭殃」。

結果最成功的是模擬「銀律」的 Tit-for-Tat 程式。這個程式一開始採取合作，若對方也肯合作，接下來則仍採合作策略；若對方吃你豆腐，下一步你就佔回便宜。

在實驗中，實施金律的程式一敗塗地，屍骨無存，可見咱們先總統蔣公介石對日本「以德報怨」的做法是行不通的；實施鐵律策略的程式一開始也有不錯的表現，但長期下來，所有被它吃豆腐的人不是死了，就是躲它遠遠的，它最後也沒戲唱。

有一個鐵律例子，就是石油大王 John Rockefeller（1839 ～ 1937）。

他專耍先下手為強的手段，整垮所有對手，成為最有錢的人。但他的手段未免太狠，大夥都不敢恭維。Rockefeller 也知道自己以前做事實在不上道，因此在退休後的餘生，致力於慈善事業補過。然而，他過去的作為仍然禍貽子孫，他的後人能力再強，條件再好，想選總統，至今都選不上。

「專家系統」之父，Edward Feigenbaum。

Raj Reddy與 Edward Feigenbaum共同獲得 1994年的圖靈獎殊榮，也是該獎項的第一位亞裔專家。

AI Revelations

Geoffrey Hinton, Turing Award recipient, recently talked about the potential dangers posed by artificial intelligence (AI).

Frequently, AI acquires unexpected behaviors through the analysis of extensive datasets. However, this doesn't necessarily imply that AI possessing autonomous consciousness will bring about the downfall of humanity. Instead, it highlights our inability to predict AI behavior, especially when individuals and businesses allow AI systems not only to generate their code but also to execute these programs on their own machines. Hinton is concerned thatOne day, genuine autonomous weapons may turn those lethal robots into reality.

The first functional AI systems, referred to as expert systems, were developed by Edward Feigenbaum and Raj Reddy independently. These intelligent computer programs have the ability to employ knowledge and reasoning to address intricate issues that are typically within the realm of experts' capabilities. Their achievements in this field earned them the prestigious Turing Award in 1994.

However, many systems require the simulation of a significant number of parameters, and this challenge remains unsolved to this day. This underscores the extensive and profound applications of computer simulation. Despite the rapid progress of AI technology, there are still many subjects deserving of thorough exploration.

In 1950, Alan Turing (1912-1954) published a significant paper titled "Computing Machinery and Intelligence," in which he initiated discussions about AI and proposed the Turing test. This test established a benchmark for developing intelligent systems within the field of information technology.

The Turing test revolves around the criterion of whether a computer program can successfully trick humans into thinking it is human. Once it accomplishes this, it would be qualified as an intelligent machine. The foundation of AI is rooted in emulating human behaviors and is frequently applied in the field of sociology as well.

During the 1980s, Robert Axelrod, a professor of political science at the University of Michigan, conducted a series of computer simulation experiments. He assembled a team of specialists to develop various computer programs that replicated human behavior. These programs were set up to interact with each other and form alliances to determine the ultimate winner among them. A subset of these programs emulated the 'Golden Rule,' while others followed the 'Silver Rule,' and the rest simulated the 'Iron Rule.'

The so-called "Golden Rule" comes from the New Testament, Matthew 7:12, where it states, "In everything, do to others what you would have them do to you." The concept of the "Silver Rule" is retrieved from the Old Testament, in Exodus 21:24, "eye for eye, tooth for tooth, hand for hand, foot for foot." The "Iron Rule," often interpreted as "Do unto others as you like before they do unto you," is externally manifested as "He who strikes first prevails, he who strikes late fails."

The Tit-for-Tat program, which simulates the 'Silver Rule,' emerged as the most successful outcome. Initiated with cooperation, the program maintains the cooperative strategy if reciprocated by the counterpart. In cases of betrayal by the counterpart, the subsequent action involves responding with corresponding retaliation.

During the experiment, the program applying the Golden Rule experienced complete failure, leaving no evidence of its effectiveness. This demonstrates the impracticality of the approach advocated by our former President, Chiang Kai-shek, who aimed to respond to Japan's hostilities with kindness. Similarly, the program utilizing the Iron Rule strategy showed promising results initially. However, as time passed, those affected by its effects either suffered severe consequences or deliberately kept their distance from it. Ultimately, this strategy also failed to yield any meaningful outcomes.

A classic example of the Iron Rule is the oil tycoon John Rockefeller (1839-1937).

He employed ruthless tactics to initiate preemptive actions and get ahead, which led to the downfall of all rivals and propelled him to become the wealthiest person. However, his approaches were subjectively deemed excessive, causing people to be reluctant to express approval. Rockefeller himself was aware of the ethical shortcomings of his prior actions. Consequently, he committed himself to charitable pursuits in an attempt to make amends during his later years after retirement. Nevertheless, the consequences of his past actions continued to trouble his descendants. Regardless of the abilities or favorable circumstances enjoyed by his descendants, their aspirations for the presidency have remained unattainable to this day.

泰勒展開式的傳奇

文／林一平 講座教授

拉格朗日（Joseph Lagrange；1736-1813）。林一平／繪

最近我以 ChatGPT 加持的 Wolfram 數學平台進行一些泰勒展開式（Taylor expansion）的變形運算。ＡＩ可以通過自動計算來操作泰勒展開式的係數，給我不少相當有意思的答案，令我喜不自勝。接下來反思，我是不是被ＡＩ取代了。我早期進行無線通訊研究，分析無線電通道時，會用到泰勒展開式，只要問題能套入泰勒展開式，總是探驪得珠般的精神一振，因為複雜的數學式子可藉此清理乾淨。泰勒展開也運用於ＡＩ，神經網路的表現取決於其參數值，在訓練過程中會進行調整。泰勒展開可用於調整ＡＩ參數值，實現更有效的優化。

是誰想出這個好方法？顧名思義，自然是泰勒這位學者。展開式的確是以英國數學家泰勒（Sir Brook Taylor）命名。然而法國學者拉格朗日（Joseph Lagrange）早在一七九七年之前，就提出帶有餘項的泰勒定理。泰勒級數有無限多項，實際應用中，需要截斷，只取有限項，再利用泰勒定理估算這個近似值的誤差。我靠計算誤差，發表了好幾篇期刊論文。

泰勒展開式最神奇的故事發生在俄羅斯革命期間。約一九一七年，廿三歲的塔姆（Igor Tamm; 1895-1971）是烏克蘭奧德薩（Odessa）大學的物理學教授。當時兵荒馬亂，食物短缺，所以餓著肚皮的他去附近的一個村莊尋找食物。當他來到村子時，運氣不好，遇到一群反對共產黨的暴徒，包圍了整個城鎮。塔姆穿著城市服裝，不像一般村民，讓暴徒們相當起疑，當場將他拿下。

暴徒首領問他以什麼為生。他解釋，自己是一名大學教授，在尋找食物。「你在大學教啥學科？」塔姆結結巴巴地回答說：「我教數學。」暴徒首領說：「好吧。我出個數學題目讓你解解看。你將麥克勞林（Maclaurin）系列展開到第ｎ項，然後算出其誤差。算對了饒你一命，算錯了，我就開槍打你，讓你蒙主寵召。」麥克勞林級數是函數在 x=0 處的泰勒級數，是牛頓的學生麥克勞林於一七四二年推導出來的。

塔姆聽完後，可不是一般的驚嚇。在槍口下，握筆發抖，硬著頭皮，以泰勒展開式，戰戰兢兢地慢慢計算，設法找出了答案。他把結果展示給暴徒首領。首領細讀了一下，宣布道：「正確！回家吧。」塔姆屁滾尿流的逃離，也不知道土匪的名字。

塔姆後來發現契忍可夫輻射（Cherenkov radiation）而獲得一九五八年諾貝爾物理學獎。今日的學生養尊處優，常常讓我艷羨的想起暴徒首領，很想學他，拿槍逼學生，或許可以逼出一點研究成果。那麼ＡＩ是否能取代數學家？當暴徒拿槍逼您當場推導泰勒展開式時，ChatGPT 是幫不上忙的。（作者為前科技部代理部長）

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The Legend of Taylor expansion

Recently, I've been exploring various manipulations of Taylor expansion on the Wolfram mathematics platform with the assistance of ChatGPT. AI demonstrates the capability to automatically compute coefficients within Taylor expansions, resulting in intriguing and genuinely delightful answers. This leads me to contemplate whether AI is gradually replacing me. In my earlier years, I immersed myself in wireless communications research, employing Taylor expansion during the analysis of radio channels. Each time a problem fit into a Taylor expansion, it felt like a moment of enlightenment, given its ability to organize intricate mathematical expressions neatly. Moreover, Taylor expansion finds application within the realm of AI. The effectiveness of neural networks relies on adjusting their parameter values during the training process. Taylor expansion can be leveraged to fine-tune AI parameter values, enabling more efficient optimization.

Who devised this effective method? As the name implies, it was none other than the scholar Taylor himself. The expansion is, indeed, attributed to the British mathematician Taylor (Sir Brook Taylor). However, before 1797, the French scholar Lagrange (Joseph Lagrange) introduced the concept of the Taylor theorem with remainders. The Taylor series consists of an infinite number of terms, but in practical applications, truncation becomes necessary, involving the selection of a limited number of terms. Subsequently, the Taylor theorem is used to estimate the error in this approximation. I have published multiple journal papers focused on the computation of errors.

The most remarkable story involving the Taylor expansion occurred during the Russian Revolution. Around 1917, a 23-year-old named Igor Tamm (1895-1971) held a position as a physics professor at Odessa University in Ukraine. This period was marked by chaos, disorder, and a scarcity of food. With hunger gnawing at his stomach, Tamm ventured into a nearby village in search of food. Unfortunately, luck did not favor him upon his arrival. He found himself face-to-face with a group of anti-communist rioters who had surrounded the entire town. Tamm's urban attire set him apart from the typical villagers, arousing suspicion among the rioters and ultimately leading to his instant capture.

The mob leader inquired about his means of livelihood. Tamm explained that he was a university professor and was searching for food. What subject do you teach at the university? Tamm stuttered in reply, I teach mathematics. The mob leader said, Very well. I shall present you with a mathematical problem to solve. Expand the Maclaurin series up to the nth term and calculate the error. Should you provide the correct answer, your life shall be spared. An incorrect response, however, will result in a gunshot, allowing you to meet your Creator. The Maclaurin series is, in fact, the Taylor series of a function at x=0, formulated by Newton's student Maclaurin in the year 1742.

Having listened, Tamm was more than just scared. With the gun's muzzle aimed at him and his hand trembling as he held the pen, he summoned his courage and, using Taylor's expansion, carefully and gradually worked out the solution. He then displayed the outcome to the mob leader. After scrutinizing it closely, the leader announced, Correct! You're free to leave. In a state of panic, Tamm hurriedly escaped, not even aware of the bandit's name.

Tamm's subsequent discovery of Cherenkov radiation earned him the 1958 Nobel Prize in Physics. Today's students, who are familiar with a comfortable and privileged lifestyle, often evoke within me a sense of envy for the mob leader. I find myself genuinely intrigued by the notion of adopting his tactics employing intimidation with firearms against students as it might potentially lead to research breakthroughs. This raises the question: Can AI truly replace mathematicians? Nevertheless, when faced with a scenario in which a gangster forces you to perform an on-the-spot derivation of a Taylor series at gunpoint, ChatGPT would be unable to provide any assistance.

Dr. Jason Yi-Bing Lin

Lifetime Chair Professor of the Department of Computer Science at National Yang Ming Chiao Tung University and Winbond Chair Professor

Dr. Lin is currently a lifetime chair professor of the Department of Computer Science at National Yang Ming Chiao Tung University and Winbond chair professor. He is an ACM Fellow, IEEE Fellow, AAAS Fellow and IET Fellow. His research interests include Internet of Things, mobile computing, and system simulation. He has developed an Internet of Things system called IoTtalk, which is widely used in smart agriculture, smart education, smart campus, and other fields. He has a variety of interests, such as art, painting, and writing, as well as voyaging through science, technology, and humanities.

Nvidia 首席研究總監 劉洺堉博士：實時肖像生成技術的革命性突破

文／鍾乙君、高嘉豪 多工所碩士生、林廷翰 機器人碩士學位學程碩士生

在當前疫情後時代，線上會議的普及程度前所未有。因此，對於能夠準確代表個人的虛擬形象需求大幅增加。近年來，我們見證了許多驚人的技術突破，其中之一便是影像生成領域的顯著進展。為了探索這一領域的最新成果，我們邀請到劉洺堉博士在陽明交通大學舉辦兩場 演 講「Deep-learning-based Live Portrait」及「Diffusion Models for Image, Video, and 3D generation」，聚焦於他如何以專業來解釋現代生成技術的進展與風險。

劉洺堉博士為 NVIDIA 高級研究總監，並帶領著一個專注於深度生成模型及其應用的研究小組。他的貢獻對於 NVIDIA 產品的開發至關重要，例如 NVIDIA Maxine 和 NVIDIA Picasso 等產品。劉博士在該領域的卓越表現獲得了廣泛認可，因此劉洺堉博士也是影像生成領域中備受矚目的研究者，在深度學習技術的推動方面，成功實現了逼真卻又由人工創造的內容。

劉博士首先介紹了他們在實時肖像生成方面的方法，該方法涉及將影像拆分為不同的特徵，例如外貌、頭部姿態和表情。這種拆分不僅可以在傳輸成本最低的情況下高效重建原始影像，還可以通過操縱不同特徵來生成人工影像。值得一提的是，他們的影像壓縮技術的編碼效率比傳統的 H.264 影像壓縮標準高出十倍，但劉博士也承認，這種方法確實需要更多計算複雜度。

在先前的方法中，遮蔽是一個常見的挑戰，這指的是源圖像中不可見的區域，因此很難進行準確的合成。當僅使用單一源圖像作為輸入時，問題就會出現。為了克服這個限制，團隊使用多個圖像集進行生成，並使用適應不同輸入幀數的變壓器設計。此外，劉博士還展示了他們基於音頻輸入的臉部運動生成工作。通過利用來自 YouTube 的大量可用影像，他們訓練了一個模型，使得能夠將音頻與臉部運動相互關聯，因此能夠僅基於音頻就生成表情。

在肖像生成的過程中，照明也是一個至關重要的方面。在一個設置在陽光明媚的場景中的線上會議中，即使在昏暗的室內環境中，也要讓人物看起來照明逼真。為了解決這個問題，劉博士提出了一項將輸入影像重新照明以適應任意照明環境的方法。這個方法涉及使用各種環境下的多樣人物圖像，可以在更低成本下實現相當水準的效能。

劉博士也強調了在這些技術開發過程中，訓練數據的重要性。正如聊天機器人 (ChatGPT) 的架構在每個版本中保持相對穩定一樣，關鍵的改進在於數據的收集和處理方面。對於肖像生成的每個模塊，高質量的訓練數據都是不可或缺的，以保證其有效運作。

在劉洺堉博士深度影像生成的演講中，他展示了人工智慧在這方面所取得的顯著進展，也為我們提供了有關當前最先進技術的深入見解與寶貴的啟示。他們的工作為增強虛擬互動提供了令人興奮的可能性，同時也有望應用於其他領域。在此，我們要向劉洺堉博士表達最衷心的感謝，感謝他的慷慨分享。他的演講為我們打開了一扇通往人工智慧前沿的大門，也為未來數字科技的發展指明了方向。我們期待著更多的精彩演講和突破性研究，同時也期盼著這些創新成果能為我們的生活帶來更多便利與驚喜。

Nvidia Chief Research Director Dr. Ming-Yu Liu: Revolutionary Breakthrough in Real-time Portrait Generation Technology

In the post-pandemic era, holding online meetings in the workplace has become very common. Therefore, there is a significant increase in demand for accurate representations of individuals through virtual avatars. In recent years, we have witnessed many astonishing technological breakthroughs, one of which is the remarkable progress in the field of image generation. To explore the latest advancements in this field, we invited Dr. Ming-Yu Liu to give two lectures at our school, titled Deep Learning-Based Live Portrait and Diffusion Models for Image, Video, and 3D Generation. These talks focused on his expertise in explaining the advances and risks of these technologies."

Dr. Ming-Yu Liu is the Chief Research Director at NVIDIA, where he leads a research group dedicated to deep generative models and applications. His contributions are vital to the development of NVIDIA products, such as NVIDIA Maxine and NVIDIA Picasso. His outstanding performance in this field has gained wide recognition in the domain. In the talk, Dr. Liu first introduced their approach to real-time portrait generation, which involves splitting images into different features, such as facial appearance, head pose, and expressions. This segmentation not only allows for efficient reconstruction of the original image at the lowest transmission cost but also enables the generation of artificial images by manipulating different features. In addition, the image compression technology of their encoding efficiency is ten times higher than the traditional H.264 image compression standard. However, Dr. Liu acknowledges that this approach does require more computational complexity.

For example, Occlusion has been a challenge in previous methods. It refers to the invisible areas in the source image that decrease the accuracy of synthesis, especially when using a single source image as input. To overcome this limitation, his team used multiple image sets for generation and designed transformers capable of adapting to different input frame rates. Additionally, Dr. Liu demonstrated their work on facial motion generation based on audio input. By utilizing a vast amount of available video footage from YouTube, a model was trained to associate audio with facial movements. Therefore, expressions can be generated solely based on audio.

Lighting is also another crucial aspect in the portrait generation process. In an online meeting set in a sunny environment, it is necessary for the participants to appear realistically lit even in dim indoor surroundings. To address this issue, Dr. Liu proposed a method that re-illuminates input images to adapt to any lighting environment. This method involves using diverse images of individuals in various lighting conditions and achieves a substantial level of performance at a lower cost. Dr. Liu also emphasized the importance of training data in the development of these technologies. Just as the architecture of chatbots like ChatGPT remains relatively stable in each version, key improvements lie in data collection and processing. High-quality training data is crucial for the effective operation of each module in portrait generation.

In Dr. Liu's lecture on deep image generation, he showcased significant advancements in artificial intelligence in this regard and shared profound insights and valuable experiences about the current state-of-the-art technology. Their work offers exciting possibilities for enhancing virtual interactions and holds promise for applications in other fields. We would like to express our heartfelt gratitude to Dr. Liu for his generous sharing. His lectures demonstrated insight into artificial intelligence and pointed the way to the future development of digital technology. We look forward to more exciting lectures and groundbreaking research and hope that these innovative achievements will bring us greater convenience and surprises in our lives.

萊斯大學 Ashutosh Sabharwal 教授演講

Next-generation Wireless Networks will be “Multi-function”

文／李昕穎　網路工程研究所碩士生

Ashutosh Sabharwal 教授是美國著名大學萊斯大學 (Rice University) 電機與電腦工程系的系主任兼 Ernest Dell Butcher 講座教授。他同時擁有 IEEE Fellow、ACM Fellow 和 Fellow of National Academy of Inventors 等多項榮譽。他曾獲得多個學術獎項，包括 2021 ACM SIGMOBILE Test-of-time Award for full-duplex、2020 Best Paper (Honorable Mention) for “High Resolution Diffuse Optical Tomography using Short Range Indirect Subsurface Imaging”、ICCP 2020、2019 ACM MobiCom Best Community Contributions Award for HealthSense、2019 ACM SIGMOBILE Test-of-time Award for WARP、2018 The IEEE Communications Society Award for Advances in Communications (equivalent of the ACM Test-of-time award for Communications Theory)、2018 Teaching/Mentoring Award, Graduate Student Association、2017 IEEE Jack Neubauer Memorial Award、2011 Best Demo at mHealthSys 等。其中 ACM SIGMOBILE Test-of-time Award 相當難得，該論文必須發表於國際頂尖會議 ACM MobiCom 十年以上，經過時間的淬鍊，為學術界公認仍有極大貢獻之論文。ACM MobiCom 每年接受率約 10% - 20%，相當重視系統實作，為世界各國頂尖團隊競相發表之殿堂。Dr. Ashutosh Sabharwal 獲得 ACM SIGMOBILE Test-of-time Award 兩次，在全世界相當罕見。Ashutosh Sabharwal 教授是國際通訊領域公認的頂尖研究學者，在無線通訊系統和網路的理論和實驗方面做出了卓越的貢獻，並在國際通訊領域中扮演重要的領導角色。

陽明交通大學資訊學院於 2023 年 6 月 28 日邀請到 Ashutosh Sabharwal 教授進行一場關於無線網路相關研究的專題演講。在演講中，Ashutosh Sabharwal 教授首先簡要介紹了他所屬的 Rice University 以及 Sabharwal Digital Health Group 和 Sabharwal Wireless Group。他提到隨著 5G 無線系統使用大量天線來覆蓋廣泛的頻譜，我們有機會利用這些頻譜來「imaging」周圍的環境，並將此技術應用於機器人、無人車等領域。此外，Sabharwal 教授還提到他的研究團隊在過去十年間在 multi-function networks 的貢獻，包括與 self-interference 相關的研究等。最後，Sabharwal 教授介紹了他們最近在研究的領域，該研究旨在通過實驗和理論研究更全面地了解如何權衡「場景中更多的 illumination 對於 imaging」和「通過 channel 的最大能量傳輸對於 communication」所帶來的利益。

這次的演講活動拓寬了我們對無線通訊網路研究的視野。除了無線網路與通訊之外，還有許多其他相關領域值得深入瞭解，例如 Sabharwal 教授在演講中提到的「imaging environment」。透過這次的演講活動，我們也有機會了解他國研究生的研究方法，以及 Sabharwal 教授實驗室的最新技術進展，這對於我們未來的研究有著相當大的幫助。

Dr. Ashutosh Sabharwal, Rice University,

Next–generation Wireless Networks will be “Multi–function”

Dr. Ashutosh Sabharwal, the Ernest Dell Butcher Professor and chair of electrical and computer engineering (ECE) at Rice University, USA, is recognized with titles such as IEEE Fellow, ACM Fellow, and Fellow of the National Academy of Inventors. He has earned numerous academic rewards, including 2021 ACM SIGMOBILE Test-of-time Award for full-duplex, 2020 Best Paper (Honorable Mention) for "High Resolution Diffuse Optical Tomography using Short Range Indirect Subsurface Imaging" at ICCP 2020, 2019 ACM MobiCom Best Community Contributions Award for HealthSense, 2019 ACM SIGMOBILE Test-of-time Award for WARP, 2018 IEEE Communications Society Award for Advances in Communications (equivalent to the ACM Test-of-time award for Communications Theory), 2018 Teaching/Mentoring Award from the Graduate Student Association, 2017 IEEE Jack Neubauer Memorial Award, and 2011 Best Demo at mHealthSys, etc. Among them, The ACM SIGMOBILE Test-of-time Award is exceptionally rare. The paper must have been published at the premier international conference, ACM MobiCom, for over a decade, maintaining continuous recognition for its significant contribution to the academic community. With an acceptance rate of approximately 10% - 20%, ACM MobiCom places great importance on system implementation, serving as a platform for leading teams worldwide to showcase their work. Dr. Sabharwal has received the ACM SIGMOBILE Test-of-time Award twice, a remarkably rare achievement globally. Widely recognized as a prominent research scholar in the international communication field, Dr. Sabharwal has made remarkable contributions to the theory and experimentation of wireless communication systems and networks, while concurrently playing a pivotal leadership role in the global communication community.

On June 28, 2023, Dr. Ashutosh Sabharwal was invited by the College of Computer Science at Yang Ming Chiao Tung University to deliver a special lecture on research related to wireless networks. During the speech, Dr. Sabharwal provided a concise overview of Rice University, where he is affiliated, as well as the Sabharwal Digital Health Group and Sabharwal Wireless Group. He delved into the potential of leveraging the extensive spectrum covered by the 5G wireless system, equipped with numerous antennas, for "imaging" the surrounding environment. This technology has applications in diverse areas such as robotics and autonomous vehicles. Furthermore, Dr. Sabharwal highlighted the achievements of his research team in the field of multi-function networks over the last decade, including investigations into self-interference. Concluding his presentation, he unveiled their current research focus, aiming for a comprehensive understanding of the trade-offs between "increased illumination in the scene for imaging" and "maximizing energy transfer through the channel for communication" through experimental and theoretical research.

The lecture has expanded our perspective on research in wireless communication networks. Beyond wireless networks and communication, numerous related areas, including the "imaging environment" highlighted by Dr. Sabharwal during the lecture, are worth exploring. This event provided us with the chance to understand the research methods employed by graduate students from other countries and stay updated on the latest technological advancements in Dr. Sabharwal's laboratory. Such insights are invaluable for our future research.

史丹佛大學 Michael Saunders 教授演講

Algorithms for Constrained Optimization: The Benefits of General-purpose Software

文／林欣辰 智能系統研究所碩士生

Michael Saunders 教授為大師級學者，目前為美國頂尖大學史丹佛大學 (Stanford University) Department of Management Science and Engineering (MS&E) Research Professor，在國際學術界具有舉足輕重的地位。他的許多經典理論成果被許多教科書收錄，此外，他參與發展的許多軟體如 MINOS、NPSOL、SNOPT 亦被廣泛使用。他亦為 ISI 高引用學者 (Highly Cited Researcher)，並入選美國史丹佛大學發明名人堂 (Invention Hall of Fame)。 同 時，Michael Saunders 教授是 SIAM Fellow，他曾獲得多項學術獎項及榮譽，包含：1985 William Orchard-Hays Prize in Computational Mathematical Programming、Mathematical Programming Society (first recipient)、2004 ISI Highly Cited Researcher in Computer Science、2007 ISI Highly Cited Researcher in Mathematics、2007 Honorary Fellow of the Royal Society of New Zealand、 2012 SIAM Linear Algebra Prize (with S.-C. Choi and C. C. Paige)、2012 Stanford University Invention Hall of Fame (with P. E. Gill, W. Murray, B. A. Murtagh, and M. H. Wright)、2013 SIAM Fellow（For contributions to numerical optimization, linear algebra, and software） 等。Michael Saunders 教 授 是 資訊與數學領域國際公認的頂尖研究學者，他在 numerical optimization、numerical linear algebra、sparse-matrix methods 與 portable software 的研究領域方面有卓越的貢獻，居世界重要領導地位。

本系陳志成院長於 2023 年 8 月邀請到 Michael Saunders 教授來台進行學術交流及專題演講。Michael Saunders 教授在 8 月 26 日上午與同學們的座談中，介紹了他在數值方法、電腦科學領域的研究與經驗，並且與陽明交大師生相互討論各自的研究主題，有益於雙邊之交流。接著，在下午的專題演講中，Michael Saunders 教授對解決約束最佳化問題的演算法進行演講，並且介紹用於解決該類問題之通用軟體。在演講中，Michael Saunders 教授簡要說明了最佳化問題中線性規劃的基本形式，並且展示了他發展的許多最佳化軟體的應用歷史。其中以飛行器為例，最佳化方法能夠用於解決飛行器的路徑及形狀的最佳化，藉此能夠達到最佳效率。最後，Michael Saunders 教授介紹了他的研究領域的未來發展，例如時下非常熱門的 AI 人工智慧正是旨在解決最佳化問題。

本次座談與演講 Michael Saunders 教授帶領我們探索最佳化方法的發展及其應用。從中我們可以理解到，數值最佳化方法能夠幫助我們解決實際的工程問題。這次的座談與演講也能夠啟發我們，透過最佳化方法來解決研究議題，以達成更好的效率，對於我們未來的研究助益良多。

Michael Saunders, Stanford University,

“Algorithms for Constrained Optimization: The Benefits of General–purpose Software”

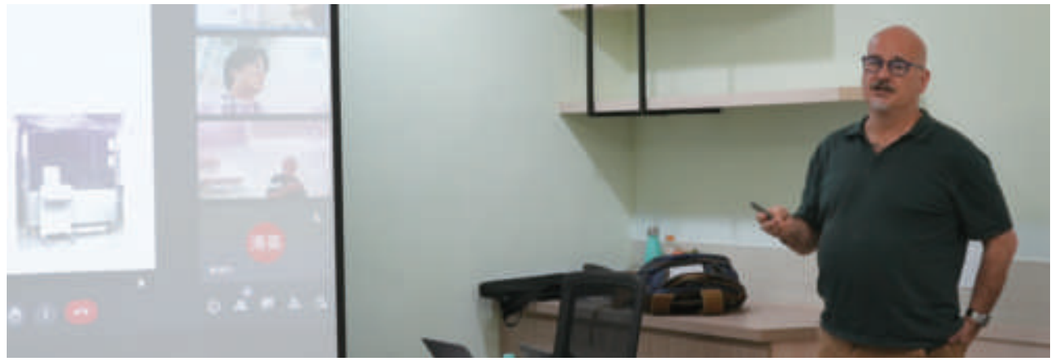
Professor Michael Saunders is a highly accomplished scholar currently serving as a Professor (Research) Emeritus in the Department of Management Science and Engineering (MS&E) at the prestigious Stanford University in the United States. He holds a prominent position within the global academic community, and his classic theoretical accomplishments are featured in numerous textbooks. Additionally, the software projects he has contributed to, such as MINOS, NPSOL, and SNOPT, are widely used. He is also recognized as a Highly Cited Researcher by ISI and has been inducted into the Invention Hall of Fame at Stanford University in the United States. Simultaneously, Professor Michael Saunders is a SIAM Fellow. His many honors include 1985 William Orchard-Hays Prize in Computational Mathematical Programming awarded by the Mathematical Programming Society (making him the first recipient), 2004 ISI Highly Cited Researcher in Computer Science, 2007 ISI Highly Cited Researcher in Mathematics, 2007 Honorary Fellowship of the Royal Society of New Zealand, 2012 SIAM Linear Algebra Prize (shared with S.-C. Choi and C. C. Paige), 2012 induction into the Stanford University Invention Hall of Fame (with P. E. Gill, W. Murray, B. A. Murtagh, and M. H. Wright), and 2013 SIAM Fellow (acknowledging his contributions to numerical optimization, linear algebra, and software), etc. Professor Saunders is a prominent research scholar in the fields of Computer Science and mathematics, both nationally and internationally. He has made a significant impact on numerical optimization, numerical linear algebra, sparse-matrix methods, and portable software, and holds a crucial leadership position in the world.

Dr. Jyh-Cheng Chen, the Dean of the College of Computer Science (CCS), invites Professor Michael Saunders for an academic exchange and a special lecture in Taiwan in August 2023. During a dialogue session with students on the morning of August 26th, Professor Saunders shared his research and expertise in numerical methods and computer science. The exchange between Professor Saunders, as well as students and faculty from Yang Ming Chiao Tung University, where they delved into their respective research topics, proved advantageous for mutual knowledge sharing. Afterward, during the afternoon speech, Professor Saunders discussed algorithms designed to tackle constrained optimization problems and introduced general-purpose software used to resolve such issues. Throughout the presentation, he provided a brief overview of the fundamental structure of linear programming within optimization problems and presented the application history of several optimization software programs he has developed. Using the example of aircraft, optimization techniques can be applied to address challenges related to the aircraft's path and configuration, ultimately achieving optimal efficiency. In conclusion, Professor Michael Saunders delved into prospective advancements in his research domain, emphasizing the current widespread interest in Artificial Intelligence aimed at addressing optimization problems.

In this discussion and lecture, Professor Michael Saunders guides us in exploring the development and application of optimization methods, revealing that numerical optimization methods can effectively address real-world engineering challenges. Furthermore, this event serves as inspiration, motivating us to apply optimization methods to address research issues, ultimately improving efficiency and contributing to the advancement of our future research.

Mr. George V. Neville-Neil 演講：Capability Hardware Enhanced RISC Instructions (CHERI) 計劃經驗分享

文／林熙哲 資訊科學與工程研究所碩士生



George V. Neville-Neil 是一位作業系統與資訊安全的專家，他從 2011 年開始參與 FreeBSD 基金會的運作，也是〈The Design and Implementation of the FreeBSD Operating System〉的共同作者，除此之外，George 也是劍橋大學 Capability Hardware Enhanced RISC Instructions (CHERI) 計劃的主要技術成員之一，這次很高興能夠在他造訪陽明交通大學資訊學院之際聆聽他對於 CHERI 計劃的分享。

CHERI 是 SRI International 與劍橋大學合作，為了從硬體層面解決記憶體漏洞（如 Buffer Overflow）而產生的計劃，能夠提供高效能、基於硬體的細粒度記憶體權限管理，CHERI 包含了基於 RISC 指令集的擴充、硬體實作以及相關的作業系統、編譯器等系統程式移植，是一個相當成熟的計劃。

在過去，有許多資安漏洞肇因於軟體開發者對記憶體操作的疏忽，例如 2014 年知名的 OpenSSL Heartbleed 漏洞，就是因為開發者遺漏了對輸入資料的檢查導致 Buffer Overflow 的問題，導致攻擊者有機會竊取 SSL 的 Private Key 甚至破解 Https 的傳輸內容。 為了避免這樣的問題，許多現代程式語言例如 Rust 特別強調在記憶體安全方面的機制，但因為是在軟體層面做檢查，終究會對效能帶來一定程度的影響。

CHERI 想做的事情，是在硬體設計時就將這些記憶體權限管理的機制考量進去，由硬體提供記憶體權限管理機制的原生支援，並將這些記憶體權限管理的額外指令放入 RISC 指令集的擴充區域，讓其他支援 RISC 的程式也都能支援 CHERI。

CHERI 能夠將指定的記憶體區段分為 Read、Write、Execute 等權限，這些權限可以組合運用，而這些權限會儲存在 CHERI 硬體提供的 Capability Register 中，在 CHERI 硬體要處理相應的記憶體位置時，硬體也會自動檢查是否符合對應的 Capability，而 Capability 的管理本身則需要作業系統的配合。

CHERI 是一個生態系很成熟的計劃，除了指令集本身支援 Arm、RISC-V、MIPS 等等以外，也有對應的硬體、系統程式與軟體配套。硬體方面， Arm 公司有提供 Morello 開發板支援 CHERI 的機制，此外 Qemu 模擬器也有支援 64bit CHERI-MIPS 模擬；作業系統的部份，有從 FreeBSD 移植過來的 CheriBSD；系統程式方面，CHERI 團隊也有移植如 Clang/LLVM、Webkit、OpenSSH、PostgreSQL、Nginx 等軟體，是一個相當成熟的計劃。

對我個人來說，我覺得這是一個很難得的學習機會，我過去的經驗都是偏向系統管理與應用開發，對系統和硬體層比較陌生，剛好在修計算機組織課程後聽到這場關於 CHERI 的分享，許多演講中提到的知識都和課程相扣，為了撰寫這篇文章我也參考了 CHERI 的官網與相關論文，在閱讀這些文獻的過程中更發覺計算機組織課程的重要性，正所謂學以致用，很感謝這場分享讓我能夠將所學到的知識實際應用，也非常感謝 George 能來陽明交通大學資訊學院分享 Capability Hardware Enhanced RISC Instructions (CHERI) 這個題目。

Mr. George V. Neville–Neil's Speech: The Experience of the Capability Hardware Enhanced RISC Instructions (CHERI) Project

George V. Neville-Neil is an expert in operating systems and information security. He has been involved with the FreeBSD Foundation since 2011 and is a co-author of "The Design and Implementation of the FreeBSD Operating System." Additionally, George is one of the key technical members of the Capability Hardware Enhanced RISC Instructions (CHERI) project at the University of Cambridge. It is a pleasure to attend this talk to understand his insights on the CHERI project during his visit to the College of Computer Science at Yang Ming Chiao Tung University."

CHERI is a collaborative project between SRI International and the University of Cambridge. Its goal is to address memory vulnerabilities, such as Buffer Overflow, at the hardware level, offering efficient, hardware-based fine-grained memory permission management. CHERI is a well-developed project that encompasses extensions to the RISC instruction set, hardware implementations, and the porting of related system software.

In the past, security vulnerabilities could occur when software developers neglected memory operations. For instance, the well-known OpenSSL Heartbleed vulnerability in 2014 resulted from developers failing to properly validate input data, which subsequently led to a Buffer Overflow issue. This vulnerability allowed attackers to potentially steal SSL private keys and even decrypt the contents of HTTPS transmissions. To prevent such problems, many modern programming languages, like Rust, emphasize mechanisms for memory security. However, because these checks are performed at the software level, they inevitably impact performance to some extent. CHERI aims to integrate memory permission management mechanisms into hardware design. The hardware offers native support for memory permission management mechanisms, including additional instructions within the custom extensions of the RISC instruction set. This enables other RISC-supporting programs to also work with CHERI.

CHERI can segment the permissions of designated memory sections, such as Read, Write, and Execute. These permissions can be combined and stored in CHERI's hardware provided Capability Register. When CHERI hardware needs to deal with corresponding memory location, it automatically checks whether it complies with the corresponding Capability. This process requires cooperation from the operating system

CHERI is a well-developed project that supports Arm, RISC-V, MIPS, and various hardware, along with accompanying system software. In addition, it provides the Morello development board, which supports CHERI mechanisms. Furthermore, the QEMU emulator also supports 64-bit CHERI-MIPS simulation. In terms of operating systems, there is CheriBSD, a FreeBSD port. As for system software, the CHERI team has ported software such as Clang/LLVM, Webkit, OpenSSH, and PostgreSQL

This talk provided a great learning opportunity for me. I typically focus more on system management and application development rather than systems and hardware. Prior to attending this lecture, I had just completed the course, Computer Organization. Many of the topics discussed in the lecture were related to the material I had covered in that course. I also visited the CHERI official website and reviewed related papers as references for writing this reflection article. While reading those references and documents, I recognized the importance of computer organization, as I was able to apply the knowledge I gained from the course to Mr. George V. Neville-Neil's talk. Lastly, I would like to express my sincere gratitude to George for visiting our school and sharing insights on the topic of Capability Hardware Enhanced RISC Instructions (CHERI).

2023 世界駭客大賽 台灣聯隊 TWN48 奪第 3 名

文／杜懿洵

DEF CON（世界駭客大賽）為全球知名資安技術研討會，議程包含資安論壇與競賽活動，其中 DEF CON CTF（搶旗攻防賽）更是各國資安好手雲集的世界級賽事，而由本校與台大學生、資安社群及業界好手所組成的「台灣聯隊 TWN 48」，更於今年 8 月在美國拉斯維加斯舉辦的 2023 年世界駭客大賽 DEF CON 31 CTF 大賽中打敗了來自中國、日本、韓國、丹麥、義大利等國駭客高手，獲得全球第三名的佳績！此次大賽冠軍為由傳統強隊美國卡內基美隆大學 PPP 戰隊與韓國 The Duck 戰隊合組的「Maple Mallard Magistrates (MMM)」，亞軍則為 CTFTime 目前世界排行榜排名首位的「Blue Water 戰隊」，而臺灣自從 2014 年獲得 DEF CON CTF 比賽第二名以來，每年都順利入圍決賽，迄今已為第 10 次進入決賽，今年更是第 3 次拿到全球第三名的好成績！

今年台灣聯隊 TWN48 是由新生代 TSJ 和 Balsn 兩大資安戰隊為核心主力，共計 54 名團員分別來自本校資工系學生及系友、台大資工系與電機系學生、以及資安社群與業界頂尖年輕好手。能取得本次榮耀，除了仰賴各選手平時不斷練習以磨練實戰技能，也透過賽前增能工作坊來達成實體見面交流，讓較少有同隊競賽經驗的戰隊成員培養合作默契，而這份默契也成為決勝關鍵！像參賽當天早上，發生了進場時競賽主機過電沒反應的小插曲，幸好團隊合作把機器拆解處理，趕在開賽前修好，順利進行比賽！

DEF CON CTF 賽制包括攻防（Attack and Defense）搶分的題目以及 King of the Hill（KOH）以領先次數或時間多寡來決定分數高低的比賽項目。此外近年更新增了偏向運動競技性質的 LiveCTF 題目類型。除了題目更為多元，主辦單位網路架構的變數更讓競賽充滿了挑戰。然而，團隊憑藉彼此間的默契與經驗，不但合作氣氛相當融洽，更在戰隊成員遇到規則變動或是網路問題等突發狀況時，都能團結合作、一同冷靜應對。

黃俊穎老師：TWN48 是台灣最具靈力的大型資安同好團體

參與本次帶隊的指導教授之一：本校資訊工程系教授黃俊穎表示，「TWN48 是台灣最具靈力的大型資安同好團體」，以「可以解決 MISC 問題」為理念，每天與電腦形影不離；初賽結束後到決賽開始前，選手自主進行兩周一次線上會議，開發競賽期間可能會使用到的工具，包括攻擊管理程式、封包分析工具、程式修正工具、計分統計工具等。

今年五月 DEF CON 31 CTF 預賽期間，台灣聯隊歷經 48 小時不間斷的競賽，在全球 1828 支隊伍中脫穎而出，以第五名之姿前進決賽。在決賽過程中，即使在安排不利的 LiveCTF 項目中沒有取得好成績，選手們仍然熬夜奮戰，讓排名一路向上攀升，最後於決賽中取得第三名佳績！而帶隊指導教授之一的國立台灣大學資訊工程系教授蕭旭君也表示，今年入圍決賽的隊伍多為各國社群聯合組成，實力不容小覷，台灣聯隊 TWN48 能獲得此成績，真屬難能可貴。

此外，相較前幾年進決賽後還需要尋找企業贊助經費，以及因準備時間短導致選手彼此沒有足夠時間彼此熟悉與磨合，此次大賽數位部資安署、國家資通安全研究院以及教育部 AIS3 團隊也一同合作協助並帶隊參賽，除了在賽前辦理增能工作坊，協助參賽團隊整備，汲取過往參賽經驗，依各類題目所需要的專長與解題需要進行專業分工，亦引入經理人機制協調團隊運作和解題分配，讓選手們能夠無後顧之憂，在比賽中全力應戰！

資安不僅與個人生活密不可分，更攸關國家安全，數位發展部也表示，希望透過制度化的模式持續為資安人才培育注入心力，推動參與國際資安競賽，讓台灣資安年輕好手累積實戰經驗，進而提升台灣在國際上的資安實戰力及競爭力。

Taiwan team TWN 48 takes 3rd place at DEF CON 31

DEF CON (Hacking Conference) is a well-known global cybersecurity technology conference that hosts cybersecurity forums and competitions. The DEF CON CTF (Capture The Flag) is particularly renowned as a world-class competition, drawing cybersecurity experts from nations. The "Taiwan team TWN 48," consisting of individuals from our university, National Taiwan University, cybersecurity communities, and industry, accomplished a remarkable achievement at the DEF CON 31 CTF competition, which took place in Las Vegas, USA in August this year. They surpassed hackers from China, Japan, South Korea, Denmark, Italy, and other countries to secure the third position globally. The top spot in this competition was taken by the "Maple Mallard Magistrates (MMM)" team, a formidable collaboration between the well-known US-based PPP team from Carnegie Mellon University and their Korean counterparts, The Duck. Following in second place was the "Blue Water" team, which currently holds the number one rank on the CTFTime world leaderboard. Ever since Taiwan's second-place finish in the DEF CON CTF competition back in 2014, the country has maintained a consistent presence in the finals, securing a global third-place finish for the third time this year.

In the current year, Taiwan's TWN48 team is led by two prominent cybersecurity teams, TSJ and Balsn. The team consists of 54 members, including current students and alumni of our university's computer science department, students from both National Taiwan University's computer science and electrical engineering departments, as well as a select group of promising young talents from the cybersecurity community and industry. In their pursuit of success in this competition, the participants didn't rely solely on continuous practice to sharpen their practical skills. They also utilized pre-competition workshops to enhance the bonding within the team by face-to-face communication. These workshops played a crucial role in fostering effective collaboration and synergy among team members, particularly those with less prior experience of teamwork. For example, on the day of the competition, a minor incident occurred when the competition machine stopped working accidentally. Fortunately, the team worked together to swiftly disassemble and repair the machine so as to ensure a seamless start to the competition.

During the competition, besides the "Attack and Defense" challenges and the "King of the Hill" (KOH) contests where scoring depends on leadership frequency or time, a recent introduction of LiveCTF challenges with a sports competition flavor has brought increased diversity to the event. The competition has also grown more demanding due to the various challenges and dynamic variables in the organizer's network architecture. Nevertheless, the team members, drawing upon their synergy and experience, not only sustain a deeply cooperative atmosphere but also unite to effectively address unexpected obstacles like rule modifications or network problems encountered by team members.

Professor Chun-Ying Huang: TWN48 is Taiwan's most spiritually empowered large-scale cybersecurity enthusiast group.

Professor Chun-Ying Huang, a faculty of our university's computer science department and one of the supervising professors leading the team in this competition, conveyed that "TWN48 is Taiwan's most spiritually empowered large-scale cybersecurity enthusiasts' community." Their fundamental philosophy centers on the "ability to solve MISC problems," and they maintain an unswerving connection with computers, rarely parting ways. Between the preliminary rounds and the start of the finals, team members autonomously hold bi-weekly online meetings to develop various tools that might prove useful during the competition. These tools encompass attack management software, packet analysis utilities, code correction applications, scoring statistics tools, and more.

During the preliminary round of DEF CON 31 CTF in May this year, the Taiwan team demonstrated their resilience by enduring 48 hours of non-stop competition, distinguishing themselves among 1828 global teams and securing a fifth-place spot in the finals. During the finals, even though they encountered difficulties in the challenging LiveCTF category, the players persisted, putting in tireless effort throughout sleepless nights. In the end, they secured a remarkable third-place ranking in the finals! Professor Hsu-Chun Hsiao, one of the coaching professors from the Department of Computer Science and Information Engineering at National Taiwan University, also noted that many of the teams that reached the finals were collaborations from international communities and possessed substantial capabilities. The brilliant accomplishment of the Taiwan team TWN48 is indeed praiseworthy.

Unlike previous years when the Taiwanese team had to proactively pursue corporate sponsorships to secure funding after reaching the finals and when the restricted preparation time impeded player familiarity and cohesion, this time, the competition received support and direction from the Administration for Cyber Security, the National Institute of Cyber Security, and the Ministry of Education's AIS3 program. They conducted preparatory workshops before the competition to assist the participating team. Leveraging their collective experience from past competitions, they formed a specialized team based on individual expertise and the specific problem-solving demands of each category. Additionally, a management mechanism was introduced to streamline team operations and the dispatch of problem-solving tasks, enabling the players to concentrate fully on the competition without any concerns.

Cybersecurity is inextricably intertwined with both individual well-being and the security of our nation. The Ministry of Digital Affairs is committed to persistently dedicating resources to nurture cybersecurity expertise through systematic mechanisms. They aim to encourage active involvement in international cybersecurity competitions, enabling young Taiwanese cybersecurity professionals to gain valuable hands-on experience so as to ultimately bolster Taiwan's cybersecurity capabilities and strengthen its competitiveness on the global stage.

台灣「第一部真空管電腦」在陽明交通大學－資訊先鋒牛車雕塑揭幕儀式

文／鍾乙君

台灣「第一部真空管電腦」在陽明交通大學－資訊先鋒牛車雕塑揭幕儀式，於今年 (2023 年) 4 月 8 日國立陽明交通大學「交大日」舉行，由陽明交大林奇宏校長、資訊學院陳志成院長引言，銅像則由藝術家江沖默雕塑，建築師陳乃中規劃景觀設計，並與捐贈系友資科系 74 級陳槐廷、資科碩 86 級尊博科技許順宗、資科系 87 級聖洋科技邱繼弘共同揭幕。

陽明交通大學是台灣資訊與電子領域研究的領導者，為彰顯於資訊領域耕耘的歷史，資訊學院院長陳志成在揭幕儀式上提及，於三年前他上任資訊學院院長時，就開始深思，要如何用最快的方式來告訴全世界，本院對於「世界第一」的期許與信心。在此我們也專訪到資訊學院院長陳志成來更加深入了解牛車的歷史與淵源。

Q：請問陳院長最原始的發想緣由為何？

A：我在約三年前上任資訊學院院長的時候，就一直在想如何做一件事，不只台灣，也讓全世界都可以知道陽明交大的資訊學院是全世界第一。講全世界第一目前有點太誇大，就當作是期許好了！各位如果去看美國各大學，校園內幾乎都有一個或數個很有名的雕像，而且那些雕像通常會伴隨著一些傳說，然後變成一個打卡景點，訪客來、任何人來都會去那邊照相，隨著社群軟體散播到全世界。所以那時候我就想如果我們可以把這段歷史還原，做成雕塑放在資訊學院的大門，就能夠讓大家記住「陽明交大電腦第一」！

Q：為什麼要強調「真空管」電腦呢？

A：1962 年 IBM 在新竹交大安裝了全台第一部磁鼓電腦 IBM 650，具磁碟儲存元件、是使用「真空管的第一代電腦」，同時也是「第一部量產的商用電腦」。但是網路上有人說 1957 年台糖公司向美國 IBM 台灣分公司買進一部 IBM 419 才是台灣第一部電腦，但是嚴格來講台糖那部 IBM 419 只是一台利用「機電元件進行會計運算」的機器。但是為了怕別人說我們混淆歷史，所以我們就強調交大擁有的是台灣「第一部真空管電腦」，這樣就沒有人可以來踢館了！

Q：請問這段歷史有原始的照片嗎？

A：有照片，但那張照片的背景也是眾說紛紜。有人說是台糖那台 IBM 419，台糖的博物館還有把這張照片放進去。但也有人踢館，說是 1963 年 IBM 在台北搬遷電腦的時候照的。還有人說是搬來交大的那台電腦。簡單講，那個年代 IBM 在台灣搬遷電腦都是用牛車在搬。

透過了解，曾留學海外的陳院長在企劃時突發奇想，借鑑許多國外知名大學皆有著名雕塑來呈現學校輝煌里程碑與信念的概念，以 1962 年台灣第一台 IBM 650 電腦由基隆港運抵新竹的校史記錄作為啟發，並為了避免與 1957 年台糖公司向美國 IBM 台灣分公司買進一部 IBM 419 歷史產生歧異，以「一種利用機電元件進行會計運算的機器」和「第一部真空管電腦」做出區隔，開始規劃於光復校區工程三館一樓前設置雕塑藝術品乙尊，展開一系列的企劃過程。

選取這樣的一段歷史的原由，陳院長也娓娓道來。在 1962 年 IBM 在新竹交大安裝了全台第一部磁鼓電腦 IBM 650，他不僅具備磁碟儲存元件、是使用真空管的第一代電腦，同時也是第一部量產的商用電腦。但由於電腦儀器十分精密，當時未能找到具有良好避震效果的氣墊車等設備，所以 IBM 在當時搬遷電腦都只好使用傳統的牛車緩緩地運送電腦。

於當時的時代背景下，台灣處在科技尚未起飛的年代，全然不見現今科技島的影子。而這樣一部劃時代的產物出現在台灣的土地上，被放置在耕作用的水牛之後緩緩拖曳著向前進，科技與傳統之間的碰撞擦出了火花，看似違和卻是台灣在科技領域的更近一步。就如同陽明交大校長林奇宏在典禮上和與會貴賓分享他參與雕塑外觀企劃的故事，資訊先鋒牛車雕塑會是現在這樣走著斜坡的模樣，便是想呈現台灣在科技歷史上堅毅不拔，最終成就不凡的精神。放置在工程三館前也是期望能夠勉勵並提醒世世代代的學生，資訊學院的歷史與貢獻，不只靠前輩奠定的基礎，也需要後進的創新與努力。

飲水思源是陽明交大的立校根本，也是全校師生謹記在心的校訓。雕塑不只是訴說著一段台灣科技歷史，也是由資訊學院所畢業的系友來捐款建造，同時還用牛的腳印紀錄了資訊學院的歷史。在歷史記憶之間勾織並總和，每個都象徵著陽明交大的過去與現在、脈絡與未來道路，期許資訊學院所立下的代表雕塑能夠引領著學子將台灣科技走到下一個里程碑。

Taiwan's First Vacuum Tube Computer was at NYCU

The Unveiling Ceremony of the Computer Pioneer Ox Cart Statue

Taiwan's First Vacuum Tube Computer was at National Yang Ming Chiao Tung University (NYCU). The unveiling ceremony of the Computer Pioneer Ox Cart Statue took place on April 8, 2023, coinciding with NYCU s Anniversary Celebration Day. The ceremony was introduced by President Chi-Hung Lin and Dean Jyh-Cheng Chen of the College of Computer Science. Renowned artist Chung-Mo Chiang (江 沖 默) crafted the bronze statue, and Architect Nai-Chung Chen (陳 乃 中) was responsible for the landscape design. The unveiling of the statue was jointly carried out by alumni, including W. T. Chen, Class of 74, Shun Tsung Hsu, Executive Director at Jumbo Technology Co., Class of 86, and Nathan Chiu, President of cacaFly, Class of 87.

National Yang Ming Chiao Tung University is a pioneering institution in the field of computer and electronics research in Taiwan. To emphasize the institution's longstanding commitment to this field, Dr. Jyh-Cheng Chen, the Dean of the College of Computer Science (CCS), shared during the unveiling ceremony that when he assumed the role of Dean three years ago, he initiated a reflection on how to swiftly convey the College's aspirations and confidence in achieving global excellence. In this context, we also conducted an exclusive interview with Dean Chen to gain deeper insights into the history and origins of this endeavor.

Q: What initially inspired Dean Chen's idea?

A: When I assumed the position of Dean at the College of Computer Science three years ago, I contemplated how to undertake an initiative that would not only raise awareness in Taiwan but also on a global scale, emphasizing National Yang Ming Chiao Tung University's College of Computer Science as a world-class institution. While asserting global superiority might sound overly ambitious, let's regard it as an aspiration. If you visit universities in the United States, nearly all of them feature one or more renowned statues on their campuses, often accompanied by legends, making them popular photography spots. Visitors and others who come to these universities flock to these sites for pictures, and these images are widely shared worldwide through social media. Therefore, at that time, I envisioned that by commemorating this history and transforming it into a sculpture positioned at the entrance of the College of Computer Science, it would serve as a lasting reminder that "National Yang Ming Chiao Tung University leads the way in the field of computer science!

Q: Why emphasize that it is a vacuum tube computer?

A: In 1962, IBM introduced the IBM 650, a drum memory computer, at National Chiao Tung University in Hsinchu. This computer featured magnetic disk storage components and is known as Taiwan's first-generation vacuum tube computer, marking the first commercially produced computer. Some argue that in 1957, the Taiwan Sugar Corporation purchased an IBM 419 from IBM's Taiwan branch, considering it as Taiwan's first computer. Nevertheless, the IBM 419 at Taiwan Sugar was primarily used for accounting calculations via electromechanical components. To avoid any historical misunderstanding, we underscore that National Chiao Tung University possesses Taiwan's "first vacuum tube computer," ensuring that there is no room for dispute on this matter!

Q: Are there any photographs from that historical period?

A: There is a photo, but the context of one particular photo is a matter of dispute. Some argue that it depicts the IBM 419 at the Taiwan Sugar Corporation, and the Taiwan Sugar Museum features this image in its exhibit. On the other hand, there are those who assert that it was taken in 1963 during IBM's computer relocation in Taipei. Some even suggest that it's a picture of the computer moved to National Chiao Tung University. To put it simply, during that era, IBM used ox carts to transport their computers in Taiwan.

Dean Chen, who had studied abroad, experienced a sudden burst of inspiration during the planning phase. He took cues from several prestigious international universities known for using sculptures to symbolize their institutional achievements and principles. He chose the 1962 historical event of Taiwan's first IBM 650 computer's arrival in Hsinchu from Keelung Harbor as his starting point. To prevent any confusion with Taiwan Sugar Corporation's 1957 purchase of an IBM 419 from the IBM Taiwan Branch, he carefully differentiated between a machine utilizing electromechanical components for accounting computations and the first vacuum tube computer. Subsequently, he embarked on a project to place a sculptural artwork in front of the Engineering Building 3 at Guangfu Campus, commencing a series of planning endeavors.

In addition, Dean Chen vividly explains the rationale behind selecting this particular historical episode. In 1962, IBM introduced Taiwan's first magnetic drum computer, the IBM 650, at National Chiao Tung University in Hsinchu. The IBM 650 featured magnetic disk storage components and was the first-generation computer using vacuum tubes. Furthermore, it marked the advent of commercially produced computers. Nonetheless, owing to the computer equipment's exceptionally precise nature, appropriate shock-absorption technology, such as air-cushioned vehicles, was unavailable at the time. Consequently, IBM had no choice but to transport the computer using traditional ox carts, moving it slowly.

During that historical period, Taiwan had not yet transformed into the tech hub we now recognize; it existed in an era where technology had not advanced as it has today. In this unique setting, an epoch-making product slowly took shape, placed on an ox cart and dragged forward by a water buffalo traditionally used for plowing. This combination of technology and tradition, seemingly incongruous, symbolized Taiwan's technological progress. During the ceremony, President Lin shared his role in crafting the sculpture's exterior design. The pioneering ox cart statue depicts an ox cart ascending a slope, serving as a symbol of Taiwan's unwavering determination in its technological history, which has led to remarkable achievements. Positioned in front of Engineering Building 3, it serves to both inspire and remind future generations of students that the legacy and contributions of the College of Computer Science rely on the foundations laid by their predecessors and the innovation and efforts of those who will follow.

The core principle of NYCU is the remembrance of one's roots and heritage, a motto deeply ingrained in the hearts of both students and faculty. This statue not only recounts a chapter in Taiwan's technological history but also came into existence through the generous contributions of CCS alumni. Additionally, it bears the imprints of cattle hooves, symbolizing the CCS s history. Woven into the tapestry of historical memory, each element represents NYCU's past and present, as well as the path to the future. We hope that this statue from the College of Computer Science will guide students toward the next significant milestone in Taiwan's technological journey.

陽明交大與奧圖碼 AI 暨虛實互動研發中心啟用

國立陽明交通大學與奧圖碼聯手共同成立「AI 暨虛實互動研發中心」，於 4 月 20 日正式啟用。由陽明交大資工系與奧圖碼研究團隊，共同在人工智能時代，研發人類與機器設備互動的技術方案，打造更多創新應用情境。

國立陽明交通大學林奇宏校長表示，在人工智能時代，人類與機器設備的互動經歷革命性的變化。對於教育產業，特別是高等教育而言，AI 與虛實互動的教育方案能讓學習更有趣，提升學習效率，培養學生自主學習能力，也能減輕教學端教學負擔，將重心放在實施創新教學及前瞻研究。特別是過去兩年新冠疫情爆發後，全球的校園學習環境經歷了停課不停學、虛擬與實體混合授課的現實挑戰，更加速了對於數位轉型和虛實互動的技術需求。陽明交大與奧圖碼「AI 暨虛實互動研發中心」的成立，不僅將學術界的研究落實在產業界的應用情境中，更能培育台灣 AI 科技人才與國際接軌。

奧圖碼陳士元董事長表示 :「奧圖碼身為大型顯示方案領導品牌，多年來致力於顯示科技的互動體驗，隨著 AI 時代全面啟動，徹底改變人機互動與設計創作的模式，產業與學術界唯有不斷創新、跨業整合方能在一日千里的 AI 環境中永續共榮；有鑑於此，我們與國立陽明交通大學資訊工程學系展開產學合作，成立『奧圖碼 AI 暨虛實互動技術研發中心』。希望能結合奧圖碼與陽明交通大學對於 AI、虛實互動感知技術的研發能量，並透過研發中心內『未來教室』的應用佈建，激發更多的想像與研究探索，將開發成果和實際產業需求結合，也期待培育更多人才投入 AI 及虛實互動領域，共同推動台灣產業的進步。」

陽明交大與奧圖碼 AI暨虛實互動研發中心啟用儀式。左：陽明交大林奇宏校長，右：奧圖碼陳士元董事長

陽明交大與奧圖碼過去已有緊密的合作關係，此次進一步透過「AI 暨虛實互動技術研發中心」的啟用，與資工系陳冠文教授及詹立韋教授以「未來教室的感知偵測」，以及「混合遠端協作與虛擬互動技術」為題，展開為期兩年的研究計畫，共同深入 AI 交互應用以及虛實互動遠近協作技術。

身為陽明交大傑出校友的奧圖碼陳士元董事長，為奧圖碼創始元老，奧圖碼自 2002 年成立以來，第一時間進行全球布局，並在影像解決方案領域成為業界翹楚，服務遍及五大洲 150 多個國家，深耕教育、企業、家用、娛樂展演各種專業領域的應用，並獲得多項國際產品設計大獎。本著企業 CSR 回饋社會的精神，奧圖碼多年來與大專院校合作，投入沉浸式教育的推廣與研發，除了「陽明交大與奧圖碼 AI 暨虛實互動技術研發中心」，也共襄盛舉參與陽明交大台灣電腦資訊發展館 - 全台首座電腦博物館的興建，提供串接互動式雷射投影設備，並捐贈互動式未來教室 86 吋互動式多點觸控螢幕以及智能教學解決方案，助於提升課堂學習專注度，讓師生在高效互動中激發更多創意和靈感，除此之外，以互動式觸控螢幕取代傳統黑板，打造無灰塵、無汙染空氣清新的教學環境。

感謝奧圖碼捐贈研究中心研究用設備，陽明交大林奇宏校長 (左二)代表致贈感謝函，由奧圖碼陳士元董事長 (右二)代表接受

圖為陽明交大與奧圖碼研究團隊合影

NYCU and Optoma Launches an AI and Virtual Reality Research and Design Center

National Yang-Ming Chiao Tung University (hereinafter referred to as NYCU) and Optoma Corporation (hereinafter referred to as Optoma) have partnered to establish the AI and Virtual Reality Research and Design Center which officially launched on April 20th, 2023. The talents from both the Department of Computer Science at NYCU and Optoma s research team have developed technological solutions that foster human-machine interaction in the era of artificial intelligence, leading to the emergence of diverse innovative application scenarios.

President Chi-Hung Lin of NYCU stated the interaction between humans and machine devices has undergone a revolutionary transformation in the era of artificial intelligence. For the education industry, especially in higher education, interactive AI and virtual reality solutions can make learning more engaging, enhance learning efficiency, nurture students' abilities for self-directed learning, while reducing the teaching burden and enabling instructors to concentrate on innovative teaching approaches and forward-looking research.

In the two years following the outbreak of the COVID-19 pandemic, the global educational landscape has faced challenges, including the 'study must not stop' policy, which has led to a fusion of virtual and in-person instruction. As a result, there has been an increasing demand for digital transformation and technologies that facilitate virtual reality interactions. The establishment of the NYCU-Optoma AI and Virtual Reality Research and Design Center not only translates academic research into practical industrial applications but also nurtures Taiwan's AI technology talent to align with the global community.

Chairman Shi-Yuan Chen from Optoma expressed, Being a prominent player in the field of large-scale display solutions, Optoma has remained dedicated to enhancing interactive experiences in display technology over the years. As the AI era unfolds fully, it has fundamentally reshaped the paradigm of human-machine interaction and design creation. Embracing continuous innovation and promoting collaboration across diverse sectors is crucial for ensuring the sustainable prosperity of both the industry and academia within the rapidly evolving AI landscape. Therefore, we have initiated an industry-academic partnership with the Department of Computer Science at NYCU, establishing the Optoma AI and Virtual Reality Research and Design Center. I hope to bring together the research capabilities of Optoma and NYCU in advancing AI and virtual-reality interactive sensing technologies. By deploying the Future Classroom within our research center, we aim to ignite greater creativity and research exploration to integrate our development achievements with real-world industry requirements. Meanwhile, we eagerly anticipate nurturing more talent within the AI and virtual-reality interactive sectors, jointly driving the advancement of Taiwan's industries.

NYCU and Optoma have a history of close collaboration. With the recent establishment of the AI and Virtual Reality Research and Design Center, they are now gearing up for a two-year research project in partnership with Professors Kuan-Wen Chen and Liwei Chan from the Department of Computer Science. This research initiative will center around Sensory Detection for Future Classrooms and Hybrid Remote Collaboration and Virtual Interaction Technology, aiming to deepen their exploration of AI interactive applications and virtual-reality collaboration technology.

Chairman Shi-Yuan Chen, an outstanding alumnus of NYCU, is one of the founding pioneers of Optoma. Since its establishment in 2002, Optoma has rapidly expanded its global presence and has become a leading player in the field of image solutions. Its services reach over 150 countries across five continents, providing specialized solutions for education, corporate, residential, entertainment, and exhibition purposes. Consequently, Optoma has also received numerous international product design awards.

Following the principles of corporate social responsibility (CSR) aimed at contributing to society, Optoma has established longstanding partnerships with universities, focusing on advancing and exploring immersive education. In addition to establishing the NYCU-Optoma AI and Virtual Reality Research and Design Center, Optoma has actively participated in the construction of the inaugural Beyond Computing Museum at NYCU, Taiwan's first computer museum, and provided comprehensive integrated laser projection equipment. Optoma has also generously donated an 86-inch interactive multi-touch screen and intelligent educational solutions for future interactive classrooms. This initiative is designed to enhance concentration within the classroom, facilitating creativity and inspiration among both instructors and students through efficient interaction. Furthermore, by replacing traditional chalkboards with interactive touch screens, they aim to create an instructional environment free from dust and enriched with fresh, unpolluted air.

敏盛醫藥與陽明交大建立精準大健康生態系

文／鍾乙君

隨著科技的不斷發展，智慧醫療正成為全球醫療產業的主要趨勢之一。盛弘醫藥於 2023 年 9 月 28 日宣布推動智慧醫療及健康創新應用邁入全新里程碑。策略聯盟發表會邀請了敏盛醫療體系的產學研合作夥伴共同參與，包括：電電公會、資策會、陽明交大資訊學院、陽明交大護理學院、陽明交大藥學院等。敏盛醫療體系建立了精準大健康生態系，將傳統線下實體醫療服務整合轉型到線上、虛擬與遠距照護，服務區域遠遠超過桃園地區，未來將與合作夥伴朝精準醫療、智慧醫療及 AI 應用醫療做出貢獻。

在這股浪潮中，台灣微軟混合雲服務平台的關鍵推動者之一，盛弘醫藥股份有限公司副總經理同時也是本院資工系 79 級的學長何偉光，扮演著引領者的角色。目前，何偉光擔任資訊工業策進會數位服務創新研究所的主任，致力於運用數位技術為傳統產業開創新服務機會，並協助新創產業蓬勃發展。而他早在 2021 年就提出，遠距服務不僅應局限於偏遠地區的醫療需求，更應擴展至慢性病患者及行動不便的病患。

盛弘與台灣微軟將合作打造中文版醫護專用 ChatGPT，由醫電數位以 Hermes 語音輸入平台，整合微軟 Azure OpenAI ChatGPT，由於是醫護人員專用的，由醫護人員輸入的資訊是正確的，未來將以此為基礎共同研發 CRM for Healthcare（客戶健康管理服務），可以提供相對精準的服務。而在此基礎下，未來的應用上也將和陽明交大資訊學院與護理學院合作發展銀光科技與全齡照護的智慧醫護平台。

未來，隨著台灣微軟與盛弘集團以及陽明交大攜手合作，將進一步推動智慧醫療技術的發展，從智慧醫療平台建置到產品開發，為民眾提供更便利、高效的智慧醫療健康服務，共同開創智慧醫療的新時代。期待未來的科技醫療發展。相信在學長的帶領下，跨足範圍將從智慧醫療平台建置到產品開發，能為民眾提供更為便利、高效的智慧醫療健康服務，也希望將這些服務推廣到全球醫療場域的客戶，共同開創智慧醫療新時代。

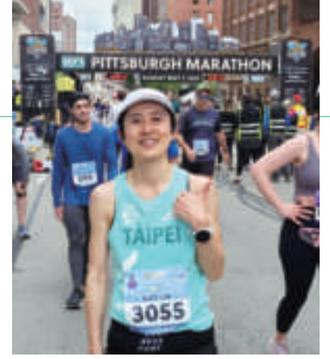
Building a Precision Health Ecosystem: Missioncare Medicine Co. Medicine and National Yang Ming Chiao Tung University Collaboration

With the continuous advancement of technology, smart healthcare is becoming a major global trend in the healthcare industry. On September 28, 2023, Missioncare Medicine Co. Medicine announced a significant milestone in promoting smart healthcare and innovative health applications. Thus, Missioncare Medicine Co. Medicine's industry-academic-research collaboration s partners were invited to participate in the ecosystem, including the Taiwan Electrical and Electronic Manufacturers Association, National Yang Ming Chiao Tung University s College of Computer Science, College of Nursing, and College of Pharmaceutical Sciences.

They aim to transform traditional offline medical services into online, virtual, and remote care. The service coverage extends far beyond the Taoyuan region. Additionally, they look forward to future collaborations with partners involved in developing precision medicine, smart healthcare, and AI applications in healthcare.

Missioncare Medicine Co. Medicine 's Deputy General Manager, Mr. Wei-Guang He, is one of the key promoters of Taiwan's Microsoft hybrid cloud service platform. He is also an alumnus of the 79th class of the Department of Computer Science at National Yang Ming Chiao Tung University. Mr. He plays a leading role in guiding this initiative, currently serving as the director of the Digital Service Innovation Institute at the Institute for Information Industry. Mr. He is dedicated to using digital technology to create new service opportunities for traditional industries and assisting the flourishing development of startups. In 2021, he proposed that telehealth services should extend beyond addressing medical needs in remote areas to also include chronic patients and patients with limited mobility across all regions.

Missioncare Medicine Co. Medicine and Microsoft Taiwan will collaborate to create a Chinese version of a healthcare-specific ChatGPT. This will involve utilizing the Hermes voice input platform by MedTech Digital and integrating Microsoft Azure OpenAI ChatGPT. The resulting healthcare professional-exclusive tool aims to ensure the accuracy of information input by healthcare personnel. Building upon this foundation, future joint development efforts will extend to Customer Relationship Management (CRM) for improved healthcare service provision. Furthermore, upcoming applications will include collaboration with the College of Computer Science and the College of Nursing at National Yang Ming Chiao Tung University to develop a smart healthcare platform for silver technology and all-age care.In the future, as Microsoft Taiwan, Missioncare Medicine Co., and National Yang Ming Chiao University collaborate, there will be further advancements in smart healthcare technology, from building smart healthcare platforms to product development. This collaboration aims to provide the public with more convenient and efficient smart healthcare services. It is believed that, under the leadership of Mr. Wei-Guang He, our senior alumni, the expansion from building smart healthcare platforms to product development will provide more convenient and efficient smart healthcare services for the public. The goal is also to extend these services to customers in the global healthcare arena, as it pioneers a new era of intelligent healthcare.



林靖茹教授榮獲 111 年度國科會傑出研究獎

文／鍾乙君

本院資訊與工程學系林靖茹教授榮獲 111 年度國科會傑出研究獎，評審委員對她近年來在雲端無線接取網路核心技術研究方面的成果給予高度肯定和讚揚。林教授的研究成果在 5G 網路發展上發揮了重要的作用，尤其是她的研究在整合軟體定義網路和人工智慧技術方面具有開創性的意義。這一成果將在未來對於經濟社會和民生福祉產生重要的應用和影響。

林教授帶領團隊在研究中提出了協同式雲端接取網路關鍵技術，該技術垂直整合了前端和後端網路技術，以滿足 5G 網路對於大規模裝置和高系統容量的需求。透過協同式設計，林教授成功加速了 5G 網路加值服務的部署，同時也解決了大規模高容量議題所帶來的挑戰。她的研究在行動通訊網路領域能有效地統籌管理分散式基地台，並為行動通訊產業引入了雲端接取網路。

此外，林教授還開創了新型態智能網路架構，將深度學習和軟體定義網路兩項技術結合起來，實現了彼此之間的互惠互利和效能優化。她提出的智慧軟體定義網路（AI-SDN）讓交換機不僅僅是資料傳輸平台，還能通過即時的模型預測提供智慧運算和服務，使網路架構不再限於裝置串連，具有更高的智能化能力。

林靖茹教授在得獎後，感謝國科會對於推廣資訊科技研究的支持，並表示很榮幸能夠獲得這項殊榮。她認為這份肯定和鼓勵將使她更加有信心和使命感，將繼續在科技研究的路上努力，為國人貢獻微薄之力，推動網通資訊科技的發展，並協助提升國際能見度。

林教授的研究成果不僅對於推動 5G 網路技術發展和智能網路設計具有重要意義，也為未來社會福祉領域帶來了巨大的影響，。我們期待她在未來的研究中取得更多突破和成就，也再次恭喜林靖茹教授獲得此等殊榮。

Professor Kate Ching–Ju Lin Won the 2022 NSTC Outstanding Research Award

Professor Kate Ching-Ju Lin, from the Department of Computer Science at our college, has been honored with the 2022 National Science and Technology Council (NSTC) Outstanding Research Award. The expert panel of judges praised her recent accomplishments in research on core technologies related to cloud-based wireless access networks. Professor Lin's achievements have had a substantial impact on the evolution of 5G networks, particularly due to her pioneering efforts in the integration of software-defined networking and artificial intelligence technologies. This accomplishment will result in notable applications that will influence the economy, society, and the future well-being of the people.

In her research, Professor Lin and her team presented pivotal technologies aimed at enhancing collaborative cloud access networks. These technologies involve the seamless integration of front-end and back-end network solutions, specifically tailored to the requirements of 5G networks, which encompass large-scale device deployment and high-capacity demands. Leveraging a collaborative design approach, Professor Lin achieved a noteworthy acceleration in the deployment of value-added services within the 5G network domain, effectively addressing the intricate challenges associated with extensive high-capacity requirements. Her research coordinates the management of distributed base stations within the mobile communication network sector, ushering in the introduction of cloud-based access networks to the broader mobile communication industry.

Furthermore, Professor Lin has pioneered a novel intelligent network framework that integrates deep learning and software-defined networking methodologies. This innovative solution led to mutual benefits and enhanced performance. The AI enabled Software-Defined Networking (AI-SDN) she proposed empowers switches not only to be in charge of data transmission but also to deliver intelligent computing and services through real-time predictive models. This innovation enables network equipment to not only perform simple data forwarding but also provide computing services.

After being honored with the award, Professor Lin conveyed her appreciation to the National Science and Technology Council for their support in advancing research in information technology. She additionally expressed her deep sense of pride in receiving this prestigious recognition. This acknowledgment and motivation will bolster her confidence and sense of purpose to continuously dedicate herself to technology research, making meaningful contributions to the country and advancing the growth of communication and information technology, while actively assisting in increasing international prominence.

Professor Lin's research holds great importance, not only in driving the development of 5G network technology and smart network design but also in leaving a substantial impact on the social welfare sector in the future. We look forward to more breakthroughs and accomplishments in her future research. Once again, congratulations to Professor Kate Ching-Ju Lin for receiving such an honor.

資訊學院教學座談會

讓學生不只是跑一趟馬拉松，而是成為跑步的人

文／鍾乙君

本院每學期都會舉辦教師教學分享座談會，邀請在教學表現傑出的教授分享教學經驗，讓學習不止於成為教學者，而是互相勉勵砌磋，將各自經驗集大成，克服在未來教學上的障礙，並向知識的傳播學問之海更近一步。

今年資訊學院邀請到榮獲 110 學年度優良教學獎以及 110 學年度院英語教學獎的謝秉均教授、110 學年度優良教學獎得主游逸平教授以及獲得 110 學年度院教學獎的林奕成教授來開講，分享他們如何在教學上精益求精，從而促成學生自主學習與思考之能力。

在本次教學座談會上，謝秉均教授分享了自己在教學上最想達成的教學目標是「喚起學生的研究魂」。謝教授的教學目標是讓學生從「知識的消費者」轉變為「知識的生產者」。他認為機率、強化學習原理和最佳化演算法是三門最能實踐這目標的課程。在這個基礎上，謝秉均教授提出了改變行為最好的方法是「改變身份認同」，讓學生的目標不只是跑一趟馬拉松，而是成為跑步的人。所以他提倡以啟發、訓練學生討論與定義問題並參與研究社群發展，讓學生自然地習慣思考與研究的模式，並將此習慣帶到其他的課程中實踐。

緊接著，林奕成教授分享了如何讓學生在課程中提升正向回饋的機率並獲得成就感。林教授提出教授自帶的氛圍會影響學生上課的意願，如果教授在教學中也能樂在其中，並輔以他自己覺得有趣的問題引起學生的興趣。例如他提出的

「如何在魔鬼終結者中製造出特定效果」需要什麼樣的演算法，就以貼近生活的趣味例子來使學生更有參與感。

最後由游逸平教授分享他如何讓學生喜歡上課的教學策略。游教授設計概論的課程，讓學生上傳他們的作業到 Github 上，這鼓勵學生使用有版本控制的系統去做好實驗，作業繳交在這個平台的使用反應非常良好。由於教學上的成功，游教授也提出了自己的想法。他建議可以用資訊學院自有的 GitLab 整合作業，並加上助教的協助來輔助學生作業，讓教學資源獲得極大化的利用。

透過三位在教學不遺餘力的教授分享，我們能夠看見本院優良的教學傳統能夠被延續，並與創新的方式融合出最適合現代學生的方法。學習不止、教學不止。隨著時代的演進，本院教授們也創造出屬於自己的訣竅，讓自身與學生之間的隔閡不會隨著年齡而擴大，而是留下歲月淬鍊而成的幹練與永不熄滅的教學熱情，為莘莘學子澆灌熱血。

CCS Teaching and Learning Symposium Let Students Become Runners, not Just Complete a Single Marathon

At our college, we organize a Teaching and Learning Symposium each semester, where we invite outstanding professors to share their teaching experiences. This initiative serves as a catalyst not only for our continuous growth as educators but also as a forum for mutual inspiration and the exchange of ideas. Our goal is to aggregate our collective experiences, overcome upcoming teaching challenges, and advance toward the expansive realm of knowledge dissemination.

This year, the College of Computer Science has invited Professor Ping-Chun Hsieh, who received both the 2021 Outstanding Teaching Award and the 2021 Award for Teaching in English, to join us for this event. We are also honored to welcome Professor Yi-Ping You, who was recognized with the 2021 Outstanding Teaching Award, and Professor I-Chen Lin, the recipient of the 2021 CCS Teaching Award. They will deliver speeches and share their perspectives on their commitment to achieving teaching excellence, with the aim of nurturing students' abilities for independent learning and critical thinking.

During the symposium, Professor Ping-Chun Hsieh shared his primary teaching aspiration, which centers on igniting students' passion for research. His educational goal is to transform students from passive "knowledge consumers" to active "knowledge producers." He thinks that courses in probability, reinforcement learning principles, and optimization algorithms represent the most effective means to achieve this objective. Expanding on this premise, Professor Hsieh suggested that the most effective method of behavior change is to "reshape one's identity," encouraging students not merely to complete a marathon but to become dedicated runners. Hence, he advocates for inspiring and instructing students in the practice of discussing and defining problems, as well as participating in the development of research communities. This approach enables students to naturally integrate thinking and research patterns into their other coursework.

Following that, Professor I-Chen Lin discussed strategies for enhancing the likelihood of positive feedback and academic success among students in the class. He emphasized that the ambiance established by an instructor can significantly influence students' motivation to participate in classes. When instructors derive enjoyment from teaching and incorporate interesting questions that engage students, this enthusiasm can stimulate their curiosity. As an illustration, Professor Lin introduced the concept of "Generating Specific Effects in Terminator" and delved into the algorithms required to achieve such effects. He illustrated these concepts using relatable and enjoyable real-life examples to foster a greater sense of involvement among students.

Finally, Professor Yi-Ping You shared his instructional strategies for fostering students' enthusiasm in the classroom. In his course of Introduction to Compiler Design, he asked students to upload their assignments to GitHub, thereby motivating them to employ a version control system for their assignments. The adoption of this platform for submitting assignments received exceptionally favorable responses. Given the pedagogical triumph, Professor You also introduced his innovative ideas; he recommended integrating the submission of homework with the college's GitLab and proposed engaging teaching assistants to provide support to students with their assignments, thereby optimizing the efficient use of educational resources.

Thanks to the unwavering commitment of three professors who put their utmost effort into teaching, we can observe how our college's outstanding teaching heritage can sustain and seamlessly merge with innovative approaches tailored to the needs of modern students. The pursuit of knowledge is eternal, as is the act of teaching. As society advances, our faculty members have developed their unique techniques to ensure that the gap between them and their students doesn't widen with time. Instead, they cultivate lasting refinement and nurture an enduring passion for teaching throughout the years, which continues to ignite and inspire students' aspirations.

資訊學院碩、博士生積極培養課外英文能力

文稿整理／劉美君

本學院在 110 學年度起獲選為教育部雙語計畫重點培育學院。為提升本院學生的英文能力，進而晉升為國際型人才，在雙語計畫執行的第一階段，每學期皆提供免費的英語增能課程給碩、博士生報名參加，希望學生在忙碌於專業課程中也能提升自身的國際競爭力。以下為 111 學年下學期學生參與英語增能課程之心得。

徐尉庭（曾建超教授實驗室）

參加英語增能課程是我在學習語言中的一個重要轉折點。這個課程僅有短短六堂，雖說不是上完課就能馬上提高英語水平到能跟外國人溝通自如，但重要的是這堂課改變了我的思考方式和學習方法，也激起我對學習英文的興趣。

在過去的我學英文單純只是為了考試，一但考試不需要後，就停止了對英文的學習，所以遇到需要用英文溝通的場合，像是：出國旅遊、面試 ... 等，都會導致我自知英文不好而不敢用英文表達。而學習這堂課，Selina 老師十分鼓勵發言，也因為是小班制，讓人人都有機會可以充分的練習，而上課內容也是別有用心，從影片分享到玩英文遊戲都讓整個課程充滿愉快學習的氛圍。在課堂上，沒有英文好壞之分，只有看自己是否有勇氣多表達自己的想法。

參加英語增能課程是我生活中一個寶貴的經驗。這不僅讓我對英文學習方式改觀，還讓我成為一個更有自信的人。我相信這些在課程中學到的技能和價值觀將會在我的未來生活和事業中發揮重要作用。我期待著繼續不斷提升自己的英語能力，並推薦這個課程給更多有志學習英語的人。

林奕宏（曾建超教授實驗室）

我平時主要接觸英文的聆聽和閱讀部分，但相對少實際口說。參加英語口語表達課程對我來說是一個寶貴的學習機會。每週的課堂提供了與實驗室同學互動的機會，讓我能夠進行口語對話的練習。此外，每週的作業要求我們提交錄音檔，鼓勵我在課後培養口語表達的練習習慣。課程中的課堂報告也給了我準備英文演講的機會，同時也能觀摩其他同學的英文報告。總之，這門課讓我在碩士生活中有了學習英文的機會，以應對未來更具挑戰性的場合。

林思齊（曾建超教授實驗室）

我在進入研究所以前所獲得的英語教育多半以閱讀及聽力為主，在口說方面時常只能試著去複誦文本中的內容做為練習，而這門英語口說課程給了我很多機會能夠開口跟同學們以及 Selina 老師進行英文對話，也因此發現許多自己在跟他人溝通時容易卡頓的地方。在數週的課程中，老師讓同學們選擇了各自覺得有趣的主題跟其他同學報告，並讓大家討論相關內容，老師也整理一些能夠增進口說流暢度跟詞彙量的方法給大家。課程結束之後，我覺得我的口說能力相對大學時期進步許多，也獲得了一些有趣的知識，很開心能夠參加系上的英語口說課程。

李霖（曾建超教授實驗室）

我是一位非英文母語而且沒有身處在任何英語環境過的學生。儘管大多時候都能流暢的閱讀報章雜誌或論文，但遇到要表達一個簡單的需求時，時常碰到因為生疏而啞口的情況。非常感謝 Selina 老師安排的英語環境與上課題材，可以很大程度增加我們英文口說的信心。同時也給予很多自學口語的方法與管道。在課程學習的過程中會對老師的課程編排感到驚艷，她把很多口說要注意的眉角放在課程內容與作業裡。並在一段時間後利用回顧來加深印象。很推薦對於口說還會有心理壓力或是口說時常碰到字詞選擇障礙的同學來參加。

張世澤（資訊工程學系資訊中心助教）

我非常推薦學弟妹們參加學術英文寫作課程。學術英文寫作最重要的是從中文寫作邏輯轉變到英文寫作邏輯，Willy 老師詳細分析了兩者的差異。不僅如此，老師上課的架構非常清晰，對於每一項課程主題，老師提供大量的文章作為範例協助我理解。實際練習寫作後，我也能從老師的反饋中修正我在寫作上的問題。在這門課程中我學到如何組織文句來幫助讀者理解，我不僅要使用恰當的連接詞與句型，還需要通盤思考自己想表達的內容。我認為這門課不只適用於有投稿需求的同學，它適用於每一位想提升自己的寫作與表達能力同學。

林熙哲（資訊工程學系資訊中心助教）

隨著碩二的到來，出現越來越多用英文寫作的需求，從論文、口試簡報甚至履歷，在使用英文寫作時我常常覺得自己寫出來的句子和我平常閱讀到的英文文章有些不同，卻又說不清道不明，雖然現在有 Grammarly 這麼方便的工具可以幫你檢查文法和拼字，但卻很難告訴你要如何去改變句構來更符合英文寫作的邏輯。感謝 Willy 老師的英文學術寫作課程，讓我們可以瞭解到中文與英文在寫作的差異；並且這堂課用有架構的方式指導我們要如何用英文邏輯來寫作，大量的練習也讓我們成功的從「知道」的階段進到「學到」，真的很感謝學校和 Willy 老師開設這堂課。

Students Actively Participate in Extracurricular English Courses

Starting in the 110th academic year, our college was selected as a key bilingual college by the Ministry of Education's bilingual plan. To enhance the English proficiency of our students and cultivate international talents, the first phase of the bilingual program includes free English enhancement courses available for master's and doctoral students to register every semester. We hope that students can improve their international competitiveness even while managing their mandatory coursework. Below, you'll find some reflections from students who participated in the English enhancement courses during the second semester of the 111th academic year.

Allan Hsu(Dr. Chien-Chao Tseng s lab)

Attending this English-speaking course was a significant turning point in my language-learning journey. During these six sessions, it may not have immediately elevated my English proficiency to fluent communication with native speakers, but what truly mattered was how it transformed my mindset and learning approach, igniting my interest in learning English.

In the past, I mainly focused on studying English for exams. Once exams were no longer a requirement, I would cease my English studies. Consequently, I found myself lacking confidence when it came to situations requiring English communication, such as traveling abroad or job interviews. However, this course, led by our course instructor, Selina, created an encouraging environment for active participation. The small class size ensured that everyone had ample opportunities to practice, and the course content was thoughtfully designed, incorporating activities like sharing videos and playing English games. In this classroom, there was no judgment based on English proficiency; instead, it encouraged us to express our thoughts. Participating in the English Speaking Course has been a valuable experience in my life. It not only transformed the way I approach English learning but also boosted my self-confidence. I believe that the skills and values I acquired in this course will play a significant role in my future endeavors, both personally and professionally. I look forward to continually improving my English proficiency and wholeheartedly recommend this course to anyone aspiring to learn English

Justine Lin(Dr. Chien-Chao Tseng s lab)

I usually spend more time listening to and reading in English compared to speaking. Participating in an English oral speaking course has been a valuable learning opportunity for me. The weekly classes provide a chance to interact with students in our lab and practice oral communication. Furthermore, the weekly assignments require us to submit audio recordings to develop a habit of practicing spoken English outside of class. The course's classroom presentations also provide me with the opportunity to prepare English speeches and observe presentations by other students. In summary, this course has provided me with the opportunity to learn English during my master's program and prepare for challenging situations in the future.

Michael Lin (Dr. Chien-Chao Tseng s lab)

Before entering graduate school, the majority of my English education focused on reading and listening, with little attention paid to speaking. This English-speaking course provided numerous opportunities for me to practice with my lab members and Ms. Selina, our teacher. Throughout the course, I identified areas in which I struggled in communication.

Over several weeks, we were asked to choose topics of interest and present them to other students, followed by discussions. The teacher also provided methods to improve fluency and vocabulary. Upon completing the course, I felt that my speaking ability had significantly improved compared to my undergraduate years. I am delighted to have participated in this English-speaking course within our department

Darwin Lee (Dr. Chien-Chao Tseng s lab)

I am a non-native English speaker and have not been in an English-speaking environment. Although I can usually read newspapers, magazines, and academic papers fluently, I often encounter difficulties in expressing simple needs due to my unfamiliarity with spoken English. I am very grateful for the English environment and course materials provided by Selina. These resources have significantly increased our confidence in speaking English and have also offered many self-study methods and resources for improving spoken English. During the course, I was impressed by the teacher's curriculum planning. She incorporated numerous speaking tips into the course content and assignments. I highly recommend this course to students who feel stressed about speaking or struggle with word choices when speaking.

Shih-Tse-Chang (IT Center, Department of Computer Science)

I highly recommend students to participate in the Academic English Writing course. The most important aspect of academic English writing is the transition from Chinese writing logic to English writing logic. Willy, the teacher, provided detailed analyses of the differences between the two. Moreover, the structure of the teacher's classes is very clear, and for each topic, he provides examples to help us understand. After practicing writing, I was able to correct my writing issues based on the teacher's feedback. In this course, I learned how to organize sentences to help readers understand. I not only needed to use appropriate connectors and sentence structures but also needed to think comprehensively about what I wanted to express. I believe this course is not only suitable for students who need to submit papers but also for every student who wants to improve their writing and communication skills.

Hsi-Che Lin(IT Center, Department of Computer Science)

Starting in the second year of the master's program, there has been an increasing demand for writing in English, whether it be for research papers, oral presentations, or even resumes. When writing in English, I often notice that the sentences I produce differ somewhat from what I typically read in English articles. It can be challenging to express these differences. While tools like Grammarly are now available to check grammar and spelling, they don't provide guidance on how to adjust sentence structures to better align with the logic of English writing. I'm grateful for Willy's academic English writing course, which has helped us understand the distinctions between writing in Chinese and English. This course offers structured guidance on how to write with English logic, and the extensive practice has allowed us to transition from 'knowing' to 'learning.' I genuinely appreciate both the school and Instructor Willy for providing this course.

參與學術頂尖會議 躍上國際舞台

文稿整理／林珮雯

頂尖國際會議是來自世界各地的頂尖研究員與教授們參加的學術盛會，正是與同儕相互切磋、拓展國際視野的最好時機。本院鼓勵師生積極參與國際學術活動，進而為臺灣研究增加學術的能見度。以下邀請幾位參與國際頂尖會議的同學分享心得：

發表論文：Revisiting Domain Randomization via Relaxed State-Adversarial Policy Optimization

作者：Yun-Hsuan Lien, Ping-Chun Hsieh, Yu-Shuen Wang

指導教授：謝秉均老師、王昱舜老師

國際會議名稱： International Conference on Machine Learning, (ICML 2023)

該會議重要性：ICML 係頂級人工智慧會議，ICML 2023 共收到 6538 份投稿，其中 1827 份被接收，接收率約為 27.9%。

連云暄同學心得分享：感謝王昱舜老師和謝秉均老師的指導，我們對 robust RL 中常見的 domain randomization (DR) 進行了深入探討。當沒有 direct simulator access 時，如何直接隨機調整環境參數呢？我們提出一個很有趣的觀點：只需巧妙地對 state 進行 perturbation，即可達到與 DR 近乎相同的效果。也就是：Achieving DR without DR ！很榮幸本研究獲得 ICML 肯定，歡迎對 RL 領域感興趣的朋友，不論是學弟妹或是業界學界先進，來信討論。

發表論文：Multimodal Prompting with Missing Modalities for Visual Recognition

作者：Yi-Lun Lee, Yi-Hsuan Tsai, Wei-Chen Chiu, Chen-Yu Lee

指導教授：邱維辰老師

國際會議名稱 : IEEE ／ CVF Computer Vision and Pattern Recognition Conference (CVPR), 2023

該會議重要性：CVPR（Computer Vision and Pattern Recognition）是一個重要的國際電腦視覺和模式識別領域的頂尖會議。每年都有來自世界各地的研究人員參加，發表他們在電腦視覺、機器學習和影像處理等領域的最新研究成果。今年 CVPR 收到了 9155 篇投稿，並最後接受了 2360 篇，僅有 25.78%的接受率，為電腦視覺領域中最頂尖的會議之一。

李懿倫同學心得分享：我深感榮幸我的研究被 CVPR 接受。我要由衷地感謝我的指導教授和共同指導老師的細心的指導。這是我第一次親自參加國際會議，心情感到既緊張又興奮。在參加會議的過程中，我不僅有機會學習到新知識，還從各種主題演講和研討會中了解了各個領域的最新發展情況。此外，我成功地現場展示了我的研究成果，與前來參觀的學者進行有價值的討論，且獲得了許多寶貴的回饋。參加這次 CVPR 國際會議對我學術研究的提升有莫大的幫助，我期待將來再次有機會參加這樣頂尖的會議。

發表論文：Robust Dynamic Radiance Fields

作者：Yu-Lun Liu, Chen Gao, Andreas Meuleman, Hung-Yu Tseng, Ayush Saraf, Changil Kim, Yung-Yu Chuang, Johannes Kopf, Jia-Bin Huang

國際會議名稱：IEEE ／ CVF Computer Vision and Pattern Recognition Conference (CVPR), 2023

該會議重要性：IEEE/CVF Conference on Computer Vision and Pattern Recognition, (CVPR) 是世界上最重要的電腦視覺與圖形識別領域的學術會議之一。以下是該會議的重要性的幾個方面：（1）學術交流：CVPR 是學者和研究人員分享最新研究成果、討論新的理論框架和技術挑戰的重要平台。

它提供了一個環境，使來自不同背景和專業的人們能夠交流想法，推動電腦視覺和圖形識別領域的進步。（2）創新技術的展示：CVPR 是展示和探索最新技術和應用的重要場所，例如機器學習、深度學習、圖像和視頻分析等。（3）專業發展：參與 CVPR 可以增進專業知識，擴展網絡，並提供可能的職業發展機會。（4）產學研合作：許多來自學術界和工業界的領先組織會參與 CVPR，推動產學研合作，以解決實際問題並將研究成果商業化。（5）優質出版物：CVPR 會議的論文通常具有很高的質量，並且被視為該領域的頂尖出版物，為參與者提供了在高影響力期刊和會議上發表工作的機會。（6）新技術和新思想的孵化：CVPR 通常會展示最前沿的研究，並提供一個平台來評估和孵化新的技術和思想。通過這些活動和機會，CVPR 在推動電腦視覺和圖形識別領域的進步，以及促進相關研究和產業發展中起著關鍵作用。

劉育綸博士心得分享：參加 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 是一個令人開眼界的經驗。透過與頂尖學者和研究人員的交流，我獲得了寶貴的見解和新的研究思路。會議展示的前沿技術和實時演示讓我深感電腦視覺技術的強大和未來的可能性。與來自全球不同地區和機構的專業人士交流，擴展了我的專業網絡，並找到了未來合作的可能性。許多實際應用案例讓我更清晰地理解了如何將理論應用於解決實際問題。此外，會議也提升了我的交流和協作能力，並讓我深感激勵和挑戰。這次的參與經驗非常寶貴，讓我期待未來能再次參與，並在下一屆會議上展示自己的研究成果。

發表論文：LGCNet: Feature Enhancement and Consistency Learning Based on Local and Global Coherence Network for Correspondence Selection

作者：Tzu-Han Wu and Kuan-Wen Chen

指導教授：陳冠文老師

國際會議名稱：International Conference on Robotics and Automation (ICRA), 2023

該會議重要性：ICRA 是歷史悠久的機器人自動化學術組織之一，知名企業如 Apple、SONY 與百度等皆有參展。近期自駕車市場崛起，從這裡發表的內容也成為全球相關企業關注的焦點之一。

吳子涵同學心得分享：第一次參加國際會議，非常期待能與各研究領域的學者進行學術上的深入交流。在 poster section 時有許多與會者對於我的研究內容有興趣，進一步探討方法細節以及實驗成果，並提出新穎的想法與我討論，讓我收穫更多不同面向的思考。除此之外還有很多新穎的機器人展示，也是這個會議令人眼睛為之一亮的部分。

發表論文：Rectifying Skewed Kernel Page Reclamation in Mobile Devices for Improving User-Perceivable Latency

作者：Yi-Quan Chou, Lin-Wei Shen, and Li-Pin Chang

指導教授：張立平老師

國際會議名稱：International Conference on Embedded Software (EMSOFT 2023)

該會議重要性：此會議為嵌入式暨即時系統領域的頂尖會議，可參照權威排名網站 CSRankings.org

周益全同學心得分享：很高興碩士的研究成果可以被國際頂尖會議 EMSOFT 接受！感謝研究過程中張立平老師的指導，才能讓我們的研究站上國際舞台。而實驗室同儕林緯與我一同思考問題並分擔實驗工作，才能讓研究順利完成。這次投稿過程讓我學到了不少東西，特別是在論文審查時，得到了來自世界各地優秀學者的建議，這讓我們能夠重新思考並改進我們的研究。雖然過程中有許多辛苦的地方，但這是一個很難忘且難得的經驗。

發表論文：Image-based Regularization for Action Smoothness in Autonomous Miniature Racing Car with Deep Reinforcement Learning

作者：Hoang-Giang Cao, I Lee, Bo-Jiun Hsu, Zheng-Yi Lee, Yu-Wei Shih, Hsueh-Cheng Wang, I-Chen Wu

指導教授：吳毅成老師

國際會議名稱： International Conference on Intelligent Robots and Systems (IROS) 2023

該會議重要性：IROS 是智能機器人和系統領域的國際頂尖會議。研討會的範圍涵蓋了機器人學、人工智能、自主系統、感知和感知控制、機器視覺、機器學習等領域。作為一個匯聚全球機器人領域頂尖研究者和工程師的重要會議，通過學術交流、技術展示和競賽等形式，推動了機器人技術的創新和發展，為機器人技術的應用和商業化提供了有力支持。

李頤同學心得分享：非常感謝一起參加比賽的戰友李政毅、施囿維。在團隊共同的努力下，我們最終有幸能在 AWS DeepRacer 這個國際賽事中包辦前三名，完成這看似不可能的目標。然而，除了在實務技術上的成長與磨練，也感謝老師與 Cao Hoang Giang 學長犧牲假期與休息時間，給予我們在論文寫作上的指導與幫助，使得論文在方法呈現與論述都能更加的嚴謹，並獲得發表的機會。

Participating in Top Academic Conferences: Stepping onto the International Stage

Top international conferences are academic gatherings attended by top researchers and professors from around the world. It is the best opportunity to interact with others to broaden one s perspective. Our college encourages professors and students to actively participate in international academic conferences to increase the visibility of research from Taiwan. The following reflections are written by students who have participated in top international conferences to share their experiences:

Title: Revisiting Domain Randomization via Relaxed State-Adversarial Policy Optimization

Authors: Yun-Hsuan Lien, Ping-Chun Hsieh, Yu-Shuen Wang

Advisors: Dr. Ping-Chun Hsieh & Dr. Yu-Shuen Wang

International Conference: International Conference on Machine Learning, (ICML2023)

The Significance of the conference: ICML is a top artificial intelligence conference. In 2023, a total of 6,538 submissions were received by ICML. Overall, 827 submissions were accepted, yielding an acceptance rate of approximately 27.9%.

The experience of Yun-Hsuan Lien:

I would like to express my deep appreciation to Dr. Yu-Shuen Wang and Dr.Ping-Chun Hsieh for their guidance. We have delved into domain randomization (DR), a common concept in robust RL. Without direct simulator access, we discovered that simply introducing clever perturbations to the state can emulate the effects of DR. In other words, we're achieving DR without DR! We are honored that our research has been recognized by ICML. Anyone interested in the RL domain is very welcome to discuss and collaborate with us.

Title: Multimodal Prompting with Missing Modalities for Visual Recognition

Authors: Yi-Lun Lee, Yi-Hsuan Tsai, Wei-Chen Chiu, Chen-Yu Lee

International Conference: IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR), 2023

The Significance of the conference: (Computer Vision and Pattern Recognition) is a prestigious international conference in the field of computer vision and pattern recognition. Every year, researchers from around the world attend to present their newest research findings in areas such as computer vision, machine learning, and image processing. This year, CVPR received 9,155 submissions and ultimately accepted 2,360 papers, with an acceptance rate of only 25.78%.

The experience of Yi-Lun Lee:

I am highly honored that my research has been accepted by the top computer vision conference, CVPR, and I am very grateful for the guidance of my advisor and co-advisors. This is my first time attending an international conference in person, and I am both nervous and excited. Throughout my participation in the conference, I not only had the opportunity to learn new knowledge from thousands of accepted paper posters but also gained insights into the current developments across different fields from various keynotes, tutorials, and workshops. In addition, I successfully presented my research on-site, engaged in valuable discussions with scholars who stopped by to view my work and received valuable feedback. My experience participating in this top international conference has been highly beneficial, and I have gained a wealth of valuable knowledge from it. I look forward to the opportunity to attend such top conferences again in the future.

Title: Robust Dynamic Radiance Fields

Authors: Yu-Lun Liu, Chen Gao, Andreas Meuleman, Hung-Yu Tseng, Ayush Saraf, Changil Kim, Yung-Yu Chuang, Johannes Kopf, Jia-Bin Huang

International Conference: IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR), 2023

The Significance of the conference: CVPR is one of the most important academic conferences in the world for the field of computer vision and image recognition. Here are several aspects of the conference's significance:

1. Academic experience sharing: CVPR serves as a crucial platform for scholars and researchers to share their newest research findings, discuss new theoretical frameworks, and address technical challenges. It provides an environment where individuals from different backgrounds and areas of expertise can exchange ideas. It enhances the progress in the fields of computer vision and image recognition.

2. Innovative technologies showcasing: CVPR is a significant venue for showcasing and exploring the latest technologies and applications, such as machine learning, deep learning, and image and video analysis.

3. Professional development: Participation in CVPR can enhance one s professional knowledge, expand networks, and offer potential career development opportunities.

4. Industry-academia collaboration: Many leading organizations from both academia and industry participate in CVPR to promote collaboration by addressing practical issues and commercializing research outcomes.

5. High-quality publications: Papers presented at the CVPR conference are typically of high quality and considered top publications in the field. Participants are provided with opportunities to publish their work.

6. New technologies and ideas: CVPR typically presents cutting-edge research and provides a platform for evaluating and incorporating new technologies and ideas. Through these activities and opportunities, CVPR plays a crucial role in advancing the fields of computer vision and image recognition and fostering related research and industry development.

The experience of Dr. Yu-Lun Liu:

Participating in the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) is an eye-opening experience. Through interactions with top scholars and researchers, I gained valuable insights and new research ideas. The cutting-edge technologies and real-time demonstrations showcased at the conference made me appreciate the power of computer vision technology and look forward to its future potential. Engaging with professionals from diverse regions and institutions around the world expanded my network and provided opportunities for future collaboration. Many practical application cases provided me with a clearer understanding of how to apply theory to solve real-world problems. Additionally, the conference enhanced my communication and collaboration skills. This motivating experience was incredibly valuable, and I look forward to participating again in the future.

Title: LGCNet: Feature Enhancement and Consistency Learning Based on Local and Global Coherence Network for Correspondence Selection

Authors: Tzu-Han Wu and Kuan-Wen Chen

Advisor: Dr. Kuan-Wen Chen

International Conference: International Conference on Robotics and Automation (ICRA), 2023

The Significance of the conference: ICRA is one of the prestigious, long-standing academic organizations in the field of robotics and automation. Renowned companies like Apple, SONY, and Baidu have also participated in this conference. With the recent surge in the self-driving car market, the content presented at the conference has gained global attention from related companies.

The experience of Tzu-Han Wu:

It was my first time attending an international conference. I was very excited to engage in in-depth academic discussions with scholars from various research fields. During the poster section, many attendees showed interest in my research and had further discussions on method details, experimental results, and we also exchanged some novel ideas. This eye-opening experience allowed me to gain diverse perspectives and insights. In addition, there were many innovative robot demonstrations, which were also a highlight of the conference.

Title: Rectifying Skewed Kernel Page Reclamation in Mobile Devices for Improving User-Perceivable Latency

Authors: Yi-Quan Chou, Lin-Wei Shen, and Li-Pin Chang

Advisor: Dr. Li-Pin Chang

International Conference: International Conference on Embedded Software (EMSOFT 2023)

The Significance of the conference: This conference is one of the top conferences in the field of embedded and real-time systems. Please refer to the ranking website CSRankings.org.

The experience of Yi-Quan Chou:

I am delighted that the research results of my master's thesis have been accepted by the top international conference EMSOFT! I would like to express my gratitude to Dr. Li-Pin Chang for his guidance during the research process. My lab member, Lin Wei, and I brainstormed, shared the workload, and completed the research together. The submission process has taught me a lot, especially during the paper review stage, where we received valuable feedback from distinguished scholars worldwide. This enabled us to reconsider and improve our research. Despite the challenges we faced along the way, this has been a valuable experience.

Title: Image-based Regularization for Action Smoothness in Autonomous Miniature Racing Car with Deep Reinforcement Learning

Authors: Hoang-Giang Cao, I Lee, Bo-Jiun Hsu, Zheng-Yi Lee, Yu-Wei Shih, Hsueh-Cheng Wang, I-Chen Wu

Advisor: Dr. I-Chen Wu

International Conference: International Conference on Intelligent Robots and Systems (IROS) 2023

The Significance of the conference: IROS is a top international conference in the field of intelligent robots and systems. The conference covers a wide range of areas, including robotics, artificial intelligence, autonomous systems, perception control, computer vision, and machine learning. As a significant gathering of leading researchers and engineers in the robotics field, it promotes innovation and development in robotics technology through academic experience exchange, technical exhibitions, and competitions. It provides strong support for the application and commercialization of robotics technology.

The experience of I Lee:

I'm very grateful to my lab members, Zheng-Yi Lee, and Yu-Wei Shih, who joined me in the competition. Through our collective efforts, we were fortunate to secure the top three positions in the international AWS DeepRacer competition, achieving what seemed impossible. With the growth and refinement of our technical skills gained from this competition, I'd like to express my gratitude to our advisor and fellow member, Cao Hoang Giang, who dedicated their holidays and rest time to provide guidance and assistance in paper writing. Their contributions ensured the methodology and presentation were more rigorous, and helped us the opportunity to publish it in a top conference

國科會「大專生研究計畫」資工系通過率名列前茅

文稿整理／杜懿洵

資訊工程專題是本校資工系的重要必修課程之一，每年學生的作品都相當精采豐富，今年資工系同學申請國科會「大專生研究計畫」成果傑出，有高達 21 件研究計畫獲得助學金，以下是部份同學們的分享心得：

計劃名稱：Model-Agnostic Meta Action-Constrained RL: From Algorithms to Applications
學生：廖兆琪、孟祥蓉
指導老師：謝秉均 教授

現實生活中，大多數領域都擁有其「限制」的範圍，例如物理上各種機械動作和機器人有移動速度及角度的限制、通訊網路傳輸有頻寬與流量限制。由於這些限制都可以隨時改動，如訓練網路中， switch 根據不同路徑負荷量設計出最有效率的封包傳送路徑；然而，若條件改變，便必須對模型重新進行訓練，相當沒有效率。因此，我們將以 MAML 和 NFWPO 作為解法提出 MetaACRL 此類新穎的研究問題，利用 Meta Learning 的特色，實現於不同限制範圍下訓練出學習力強大之模型的目標。

計劃名稱：運用深度學習於藥物推薦與疾病預測之研究
學生：王健哲
指導教授：彭文志 教授

本計畫旨在應用機器學習演算法於醫療領域，以提升公共利益為目標。計畫的內容包括修改「用藥推薦」模型和設計「疾病預測」模型。透過比較不同用藥推薦模型的架構，我們希望能夠提供醫生更準確的藥物建議，以改善病患的治療效果。同時，我們將利用病患的檢測資料，預測罹病風險，旨在早期發現病患的潛在健康風險。

計劃名稱：AlphaZero 和 MuZero 應用於點格棋遊戲之比較
學生：張可晴、李旻融、紀竺均
指導教授：吳毅成 教授

點格棋 (Dots and Boxes) 因獨特的遊戲規則，導致其遊戲複雜度較高，這引起許多研究採取不同方式以設計出強勁的電腦對局程式。近年來，AlphaZero 以及 MuZero 相繼興起，除了將電腦棋力帶至了另一個新的高度外，也替設計電腦對局程式帶來了新的思考方向。在本研究中，我們以 AlphaZero 和 MuZero 演算法去實作出可用於點格棋遊戲的電腦對局程式；同時，也將比較二者在點格棋遊戲上的應用，是否與其他遊戲應用一樣，展現相當的表現實力。

計劃名稱：探索與使用元宇宙相關技術改善現今人力派遣流程
學生：麥文傑
指導教授：袁賢銘 教授

在元宇宙這一先進概念的誕生之際，隨著其潛在的龐大商業前景不僅引發了全球的關注，更激起了對其底層技術的熱切研究與開發，進程如火如荼。其中，分散式數位身份被視為在元宇宙內具有極大應用潛力的技術之一，因為它可以精準解決數據安全性、個人數位身份的隱私保護以及控制權的關鍵問題。在這一背景下，我們將先行投入精力，對這些先進技術進行深入研究與分析，並計劃將其應用至勞力派遣領域的特定問題中。這一選擇的背後，是基於勞力派遣所需解決的核心問題與元宇宙技術底層需求的相同性。值得一提的是，勞力派遣領域目前正面臨一系列迫切需解決的問題，如個人資料保護的不當處理或濫用、以及勞工身份的偽造等，這些問題的解決恰恰需要我們所研究的分散式數位身份。

計劃名稱：非監督式異常檢測之流模型在機器異音監控之應用
學生：陳建嘉、楊竣喆、邵筱庭
指導教授：黃敬群 教授

本研究以智能工廠為願景，期待以機器學習的方式，訓練出一款能夠以工廠機器發出的聲響作為輸入，來判斷該機器是否有運作異常之情形的模型。現實生活中的異常音訊資料相當少且難以收集，在異常音訊的訓練資料量極小或甚至沒有的狀態下，很難用二元分類器這類以監督式學習為基礎的訓練方式去訓練模型。因此，本研究採用以非監督式學習去訓練模型，使其更符合現實中的條件。流模型在某些異常檢測的研究中，展現出不錯的表現，本研究以流模型為主要架構，使模型能夠學習正常資料之特徵向量分布，藉以判斷測試資料之特徵向量是否有偏離正常資料的特徵向量分布，進而達到檢測異常之目的。

計劃名稱：速適應未曾見過的行動限制：Meta-ACRL 演算法框架
學生：吳文心
指導教授：謝秉均 教授

本計畫首創提出 Action-constrained 問題的 general solution，運用 probabilistic embeddings 學習不同任務之間的異同，最終使得於模型面對與訓練不同的測試任務時，能夠快速適應並決策出符合 action constraints 的行動且取得優異的 reward。第一次做創新演算法的專案，遇到瓶頸時有些慌亂和手足無措，感謝有指導教授和實驗室學長的幫助，才有如今的成果，一路以來困難重重，但也因此收穫許多寶貴經驗。

NSTC Undergraduate Research Fellowship

Department of Computer Science Ranked Among the Best in the Nation

The Computer Science and Engineering Project is one of the important required courses for students in the Department of Computer Science at NYCU. Each year, the students' work displays remarkable brilliance. This year, students applied for the NSTC undergraduate research project, yielding fruitful results, with as many as 21 works receiving grants. Here are some students' sharing below.

Research project: Model-Agnostic Meta Action-Constrained RL: From Algorithms to Applications

Student: Chao-Chi Liao, Hsiang-Jung Meng

Advisor: Professor Ping-Chun Hsieh

Student s sharing: In real life, most fields have their own limitations. For example, various physically mechanical actions and robots have restrictions on movement speed and angle, and communication network transmission has bandwidth and traffic limitations. Since these restrictions can be changed at any time, for example, in the training network, switch designs the most efficient packet transmission path according to different path loads; however, if the conditions change, the model must be retrained, which is quite inefficient. Therefore, we will use MAML and NFWPO as solutions to propose novel research questions such as MetaACRL, and apply the characteristics of Meta Learning to achieve the goal of training models with strong learning power under different constraints.

Research project: Research on the implementation of deep learning in drug recommendation and disease prediction.

Student: Jian-Zhe Wang

Advisor: Professor Wen-Chih Peng

Student s sharing: This project employs machine learning algorithms within the healthcare sector to enhance public interest. The research involves two main components: the revision of the 'medication recommendation' model and the design of a 'disease prediction' model. We aim to improve patient treatment outcomes by comparing various medication recommendation models and providing physicians with more accurate drug recommendations. Simultaneously, we will utilize patient health data to predict disease risk, with the goal of identifying potential health risks in patients at an early stage.

Research project: Comparison of AlphaZero and MuZero applied to the Dots and Boxes Student: Ke-Ching Chang, Ming-Rung Li, Chu-Chun Chi

Advisor: Professor I-Chen Wu

Student s sharing: Due to its unique rules, Dots and Boxes exhibits a higher level of game complexity, leading researchers to explore various approaches in developing powerful computer gaming programs. Recently, AlphaZero and MuZero have emerged as notable examples. These two algorithms, originally designed for computer chess, have also opened up new avenues of thought for computer gaming program design. In this study, we implement a computer gaming program for Dots and Boxes using AlphaZero and MuZero algorithms. Simultaneously, we compare their performance in Dots and Boxes to determine if their performance aligns with that of other gaming applications.

Research project: Exploring and Implementing Metaverse-related Technologies to Enhance the Current Human Resource Dispatching Process

Student: Wen-Chieh Mai

Advisor: Professor Shyan-Ming Yuan

Student s sharing: With the emergence of the Metaverse, a cutting-edge concept with vast commercial potential, it has not only garnered global attention but has also ignited a fervent pursuit of research and development in its fundamental technologies, progressing with great vigor. Among these, decentralized digital identity stands out as a significant potential technology within the Metaverse. It can effectively address critical issues, including data security, the privacy of individual digital identities, and control rights. In this context, we are actively engaging in an in-depth study and analysis of these advanced technologies and applying them to specific problems in the field of labor dispatch. We've chosen this direction because of the similarity between the core problems that labor dispatch needs to solve and the underlying requirements of Metaverse technologies. It's worth noting that the labor dispatch sector is currently grappling with a series of urgent issues that require resolution, such as inadequate protection of personal data and its unauthorized utilization, as well as identity forgery in the labor market. Our research on decentralized digital identity aligns perfectly with the solution to these issues.

Research project: Unsupervised Detection of Anomalous Sounds for Machine Condition Monitoring

Student: Jian-Jia Chen, Chun-Che Yang, Hsiao-Ting Shao

Advisor: Professor Ching-Chun Huang

Student s sharing: This study envisions a smart factory and aims to employ machine learning to train a model capable of detecting machine abnormalities by analyzing the sounds emitted by factory machines. In practical situations, collecting abnormal audio data is challenging due to its rarity. Consequently, training a model using supervised learning methods like binary classification becomes difficult. Therefore, this study utilizes unsupervised learning to train the model, making it more consistent with real-life conditions. The flow model has demonstrated strong performance in some anomaly detection studies. In this study, we employ the flow model as the primary structure to enable the model to learn the eigenvector distribution of normal data. This allows it to determine whether the eigenvector of the test data deviates from the norm and achieve the goal of anomaly detection.

Research Project: Fast Adaptation to Unseen Action Constraints: An Algorithmic Framework of Meta Action-Constrained RL

Student: Wen-Hsin Wu

Advisor: Professor Ping-Chun Hsieh

Student s sharing: This project proposes a general solution to action constraints for the first time. We use probabilistic embeddings to learn the similarities and differences among different tasks, with the expectation that the model can quickly adapt and make decisions that conform to the action constraints, ultimately achieving excellent rewards when facing tasks different from the training data. It was my first time working on an innovative algorithm project, and I sometimes felt flustered and lost when encountering bottlenecks. Thanks to the help of my supervisors and laboratory seniors, I have achieved the current results. Throughout the journey, there were many difficulties, but I also gained a lot of valuable experience.

本刊每學期發刊一期，做為本院師生與系友、 家長、院友的溝通橋樑。每期報導本院近期研究現況，內容包括人事動態、國際交流、師生 獲獎等。期能經由本刊使讀者掌握資訊學院最 新動態，促進彼此互動。

Published twice per year, this periodical, as a bridge between faculty, students, alumni, parents and friends of the college, is dedicated to the latest research updates, including personnel changes, international collaboration, faculty & students honors, etc., in order to assist readers to keep update of the latest developments of the College of Computer Science (CCS) and encourage mutual interaction.

致贈單智君老師（右）感謝狀

一、人事動態

◇ 自 112 年 8 月 1 日起，由陳志成教授續任本院院長，由吳毅成教授、曾建超教授及陳添福教授擔任副院長。

◇ 本院資訊工程學系單智君教授於 112 年 8 月退休，單老師榮獲本校 89 學年度、93 學年度、98 學年度傑出教學獎，老師的卓越教學備受肯定，春風化雨、培育棟樑，希望老師們能常回系上傳承經驗。

二、國際交流

◇ 美國加利福尼亞大學洛杉磯分校 (University of California, Los Angeles) 張麗霞教授於 2023 年 2 月 18 日於本系演講，講題為：「蓋婭科普講座系列 20」。

◇ 美國伊利諾大學厄巴納 - 香檳分校 (University of Illinois Urbana-Champaign)Meredith Blumthal 副院長於 2023 年 3 月 27 日至本校進行學術交流。

◇ 捷克布爾諾理工大學 (Brno Uni. of Technology) PAVEL Zemčík 院長、Martin Jirovec 先生於 2023 年 3 月 28 日至本校進行學術交流。

◇ 美國普渡大學 (Purdue University)Joe Tort 教授於 2023 年 5 月 2 日至本校進行學術交流。

◇ 美國萊斯大學 (Rice University)Ashutosh Sabharwal 教授於 2023 年 6 月 28 日至本院演講，講題為：「Next-generation Wireless Networks will be “Multi-function”」。

◇ 美國俄亥俄州立大學 (Ohio State University) Xinmiao Zhang 教授於 2023 年 7 月 3 日至本系演講，講題為：「Error-correcting codes for hyper-speed memory and data storage:from theory to practice」。

◇ 日本高知工科大學訊息學院 Shinomori, Keizo 院長率團於 2023 年 8 月 8 日來訪本院簽署合作備忘錄。

◇ 泰國農業大學 Neranuch Pachanatip 教務長率團於 2023 年 8 月 28 日至本院參訪進行雙邊合作洽談。

三 . 教師榮譽

◇ 曾新穆教授榮獲潘文淵文教基金會 2023 年研究傑出獎！

◇ 彭文志教授榮獲第 21 屆有庠科技論文獎（人工智慧類別）

◇ 張立平教授榮獲第 21 屆有庠科技論文獎（資通訊科技類別）

◇ 顏安孜教授獲選為 IJCAI 2023 Distinguished PC Member ！

◇ 劉育綸教授榮獲教育部 112 年玉山青年學者！

◇ 吳毅成教授、曾新穆教授、易志偉教授團隊榮獲 2023 未來科技獎！

◇ 范倫達教授擔任 VSA-TC Chair-Elect/Secretary 期間，VSA-TC 榮獲 IEEE Circuits and Systems Society (CASS) 表彰為 2023 CASS Outstanding Technical Committee

◇ 謝續平教授團隊榮獲 IEEE Computer 期刊「2022 年傑出專欄論文獎」，2022 年下載超過千次，為下載次數最多的文章之一。

◇ 黃世強教授、曾意儒教授、陳奕廷教授、葉宗泰教授、魏群樹教授榮獲國際高等教育專業教學認證 HEA Fellowship

◇ 林彥宇教授、張立平教授、陳奕廷教授榮獲 111 學年度校級優良教學獎。

◇ 陳添福教授、黃俊穎教授、蔡文錦教授榮獲本院 111 學年度院教學獎。

◇ 吳毅成教授、李奇育教授、林奕成教授、游逸平教授、謝秉均教授、謝續平教授榮獲本院 111 學年度院英語教學獎。

四、學生榮譽

◇ 臺灣 CTF 戰隊 TWN 48 參加 2023 DEF CON CTF 世界駭客大會，榮獲全球決賽第三名的佳績！黃俊龍教授指導徐煜倫、蔡育呈、劉力勳、王偉誠同學榮獲 TON 開發者系列工作坊 Demo Day 季軍！

◇ 張立平教授指導周益全、沈林緯同學榮獲 EMSOFT 2023 Outstanding Paper Award ！

◇ 陳健教授、陳志成教授共同指導 Muthuraman Elangovan, Muhammad Shahid Iqbal 同學榮獲 APNOMS 2023 Student Best Paper Awards!

◇ 黃敬群教授指導鄭智仁同學榮獲 IPPR 第十六屆碩士論文佳作獎！

◇ 林彥宇教授指導陳思愷同學榮獲 IPPR 第十六屆碩士論文優等獎！

◇ 莊永裕、林彥宇教授指導楊証琨同學榮獲 IPPR 第十六屆博士論文佳作獎！

◇ 曾煜棋教授、蔡俊明教授、謝君偉教授指導陳朝鵬、謝譯寬同學榮獲黃俊雄優良論文獎！

◇ 黃敬群教授指導江梓豪、薛皓謙、蕭晴駿同學榮獲 CVGIP 2023 優良論文獎！

◇ 曹孝櫟、嚴力行教授指導資工系邱頎霖、郭建良同學榮獲國家科學及技術委員會「111 年度大專學生研究計畫研究創作獎」！

◇ 彭文孝教授、杭學鳴教授指導陳沐融、謝宏笙、錢承同學榮獲 2023 IEEE ISCAS Top Creativity Award of The Grand Challenge on Neural Network-based Video Coding.

◇ 吳毅成教授指導桂浤同學榮獲 2023 TCGA 電腦對局學會博士論文獎！

1. Personnel Changes

· Dr. Jyh-Cheng Chen will continue in his role as the Dean of the College of Computer Science while Dr. I-Chen-Wu, Dr. Chien-Chao Tseng, and Dr. Tien-Fu Chen will be appointed as Vice Deans starting on the 1st of August, 2023.

· Dr. Jean Jyh-Jiun Shann retired in August 2023. She received the Outstanding Teaching Award at our university in 2000, 2004, and 2009. Her exceptional teaching skill was highly recognized. Dr. Shann has been a guiding light in nurturing future talents, and we hope she will continue to visit the department and share her valuable experiences.

2. International Collaboration

· Dr. Lixia Zhang from the University of California, Los Angeles, gave a lecture at our department on February 18, 2023, titled GAIA STEM Lecture Series 20 .

· Vice Dean Meredith Blumthal from the University of Illinois Urbana-Champaign visited our university for academic experience exchange on March 27, 2023.

· Dean Pavel Zemčík and Mr. Martin Jirovec from Brno University of Technology in the Czech Republic visited our university for an academic experience exchange on March 28, 2023.

The delegation from the School of Informatics at Kochi University of Technology in Japan visited our college.

· Dr. Joe Tort from Purdue University visited our university for an academic exchange on May 2, 2023.

· Dr. Ashutosh Sabharwal of Rice University delivered a lecture at our college on June 28, 2023, on the topic of Next-generation Multi-function Wireless Networks .

· Dr. Xinmiao Zhang of Ohio State University delivered a lecture at our department on July 3, 2023, on the topic of Error-correcting Codes for Hyper-speed Memory and Data Storage: From Theory to Practice .

· Dean Keizo Shinomori and a delegation from the School of Informatics at Kochi University of Technology in Japan visited our college on August 8, 2023, to sign a memorandum of cooperation.

· Neranuch Pachanatip, Dean for Academic Affairs of Kasetsart University in Thailand, led a delegation to visit our college on August 28, 2023 to discuss bilateral cooperation.

3. Faculty Honors

· Dr. Vincent S. Tseng has been honored with the Pan Wen-Yuan Foundation's 2023 Research Excellence Award.

· Dr. Wen-Chih Peng received the 21st Scholar Award for Technology Papers in the field of Artificial Intelligence from Y. Z HSU Foundation.

· Dr. Li-Pin Chang received the 21st Scholar Award for Technology Papers in the field of Information and Communication Technology from Y. Z HSU Foundation.

· Dr. An-Zi Yen was selected as a Distinguished PC Member by IJCAI 2023.

· Dr. Yu-Lun Liu was awarded the Yushan Young Scholar by the Ministry of Education in 2023.

· Dr. I-Chen Wu, Dr. Vincent S. Tseng, and Dr. Chih-Wei-Yi's team received the 2023 FutureTech Award.

· VSA-TC received recognition from the IEEE Circuits and Systems Society (CASS) as the 2023 CASS Outstanding Technical Committee during Dr. Lan-Da Van s term as VSA-TC Chair-Elect/Secretary.

· Dr. Shiuhpyng Shieh s team was honored with the "2022 Outstanding Column Article Award" from IEEE Computer Journal. Their article was downloaded over a thousand times in 2022, making it one of the most frequently downloaded articles.

· Dr. Sai-Keung Wong, Dr. Yi-Ju Tseng, Dr.Yi-Ting Chen, Dr. Tsung-Tai Yeh, and Dr. Chun-Shu Wei were awarded the HEA Fellowship in Learning and Teaching in Higher Education.

· Dr. Yen-Yu Lin, Dr. Li-Pin Chang, and Dr. Yi-Ting Chen received the School-Level Excellence in Teaching Award for the 111th academic year.

· Dr. Tien-Fu Chen, Dr. Chun-Ying Huang, and Dr. W. J. Tsai received the College-level Teaching Award for the 111th academic year.

· Dr. I-Chen Wu, Dr. Chi-Yu Li, Dr. I-Chen Lin, Dr. Yi-Ping You, Dr. Ping-Chun Hsieh, and Dr. Shiuhpyng Shieh received the College-level English Teaching Award for the 111th academic year.

4. Students Honors

· The Taiwan CTF team, TWN 48, participated in the 2023 DEF CON CTF World Hacking Contest and secured an impressive third place in the global finals!

· Dr. Jiun-Long Huang guided students Yu-Lun Hsu, Yu-Cheng Tsai, Li-Xun Liu, and Wei-Cheng Wang to third place in the TON Developer Series Workshop Demo Day.

· Under the guidance of Dr. Li-Pin Chang, his student Lin-Wei Shen received the EMSOFT 2023 Outstanding Paper Award.

· Dr. Chien Chen and Dr. Jyh-Cheng Chen jointly supervised students Muthuraman Elangovan and Muhammad Shahid Iqbal, who were awarded the APNOMS 2023 Student Best Paper Awards.

· Dr. Ching-Chun Huang s student, Chin-Jen Cheng, received the IPPR 16th Master's Thesis Excellent Award.

· Under the guidance of Dr. Yen-Yu Lin, his student Su-Kai Chen received the 16th IPPR Master's Thesis Distinction Award.

· Under the guidance of Dr. Yung-Yu Chuang and Dr. Yen-Yu Lin, their student Cheng-Kun Yang was honored with the IPPR 16th Doctoral Thesis Excellent Award.

· Under the supervision of Dr. Yu-Chee Tseng, Dr. Chun-Ming Tsai, and Dr. Jun-Wei Hsieh, students Chao-Peng Chen and Yi-Kuan Hsieh received the Huang Zun-Xiong Excellent Thesis Award.

· Dr. Ching-Chun Huang guided students Tzu-Hao Jhiang, Hao-Chien Hsueh, and Ching Chun Hsiao, who received the CVGIP 2023 Excellent Paper Award.

· Dr. Shiao-Li Tsao and Dr. Li-Hsing Yen supervised students Chi-Lin Chiu and Chien-Liang Kuo, who received the National Science and Technology Committee's 111th Annual College Student Research Program Research and Creative Award.

· Under the guidance of Dr. Wen-Hsiao Peng and Dr. Hsueh-Ming Hang, students Mu Jung Chen, Hong-Sheng Xie, and Chien Cheng received the 2023 IEEE ISCAS Top Creativity Award for The Grand Challenge on Neural Network-based Video Coding .

· Dr. I-Chen Wu s student Guei Hung was awarded the 2023 TCGA Computer Game Association Doctoral Thesis Award.

The delegation from Kasetsart University in Thailand visited our college.

院長的一封信

親愛的朋友：

本院結合陽明交通大學最完整的優秀師資，為全國最具規模與研究能量之資訊科系，致力於培育具前瞻視野的資訊產業人才。為朝永續經營前進，本院歡迎校友、家長與企業捐款贊助，也期盼關心本系、資訊教育的各界友人能夠響應，有您的齊力參與，是本院邁向卓越的關鍵力。期許未來有更多捐款做為學院向上提升的動力。敬祝大家平安健康，萬事如意。

國立陽明交通大學 資訊學院院長

敬上

募款計畫 資心專案／出國交換獎學金

本院肩負培育國內外資訊領域一流人才重任，全球競爭日趨白熱，若在學生時期及早培養國際觀與視野，更能提升未來的競爭力。是以本院積極推動「資心專案/交換生募款計畫」，校友慷慨溫暖捐款，期能提升在校學子國際化競爭力，燃起更多學生參與國際舞台並貢獻台灣的想法。自2014年起已有近70位學生受惠於本募款計畫，2022年有六位學生至瑞士蘇黎世聯邦理工學院、瑞典皇家理工學院、英國南安普頓大學、日本大阪大學以及中國北京大學等姐妹校交換。

募款計畫 青年講座教授獎勵金

資通訊產業是台灣高科技產業的主軸之一，人才是帶動產業升級創新的重要動力，電機資訊等熱門領域，在延攬人才的薪資缺乏競爭力，再加上目前台灣有三分之一的大學專任教師陸續退休，大批教授退休有斷層的隱憂。為爭取好的青年教授回台，本院啟動青年講座教授獎勵計畫，捐款贊助新進年輕教授加薪，鼓勵優秀人才回台，同時也留住好的教授。

募款計畫 興建資訊二館

近年陸續成立多個研究所及院級研究中心，新的教室、研究室及實驗空間需求孔急，工程三館興建已逾37年，館舍老舊，空間已不敷使用。在學校經費補助相當有限，無法改善現有教學環境的困境下，特別需要系友們慷慨解囊，募款籌措興建資訊二館經費，以提供師生更好的研究與學習環境。

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陽明交大資訊人
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