DIGI+

數位國家・創新經濟

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DIGI+ 政策發酵 新創環境已臻完備

DIGI+ Program Helps Build a Mature Startup Ecosystem

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科技會報辦公室執行秘書 蔡志宏

Zse-Hong Tsai, Executive Secretary of the Office of Science and Technology, Executive Yuan

CES 2020 focused on five major aspects of digital technology innovation: AI, 5G, Autonomous Vehicles, AR/VR, and Media Streaming. It can be foreseen that these relatively new technologies will remain the focus of development for the near future. The concept of "Tech for Good" was emphasized during CES and leans more towards using digital technology to solve social challenges, including the development of smart healthcare, smart cities, smart agriculture, and smart disaster prevention. These issues will subsequently become the center of attention for future DIGI^{+} projects.

This year, the Ministry of Science and Technology (MOST) led 82 startups under the banner of the Taiwan Tech Arena (TTA), which was established in 2018, on a campaign to the world-renowned Consumer Electronics Show (CES), an exhibition of the highest reputation and influence. Not only did Taiwan rank third in the world for the number of participating teams, but of those teams, 13 of them received CES Innovation Awards. This indicates that Taiwan's technology startups have gradually garnered international recognition, and that the island's digital environment has gradually reached a mature stage. Together, these conditions have made it possible for Taiwan's technological

2020 年消費性電子展覽（CES）的數位科技創新主要集中在五大面向：AI、5G、自駕車、AR/VR、串流媒體，可見這些近年發展的科技在短期內仍會是發展的主力，而一窺 CES 上強調的「科技向善」（Tech for Good）觀念，則著重在利用數位科技解決人類社會面對的挑戰，如：智慧醫療、智慧城市、智慧農業、智慧防災等，而這些也將是 DIGI⁺ 方案未來致力的焦點。

今年科技部以 2018 年創立的台灣科技新創基地（TTA）為品牌，率領 82 家新創征戰具有全球規模、在知名度與影響力又是最高的消費性電子展覽（CES），不僅參展數量排名世界第三，其中更有 13 組團隊獲得 CES 官方的創新大獎。這代表了我國科技新創實力已受到國際肯定，另一方面則也凸顯台灣的數位環境建置已日趨完善，才能讓這些創新科技有傲人的成績。

相關成果中的「AgriTalk 管理系統」農譯科技，利用科技解決當前台灣農業面臨的問題，以科技實現精準管理，進一步守護農夫健康、全民食安；又如友達科技為長照系統設計的智慧床墊，就是實現無接觸的遠端照護，是智慧醫療的最佳寫照；至於麥迪創人工智能科技，則以獨步業界的獨角獸型 AI 技術，判別車輛行駛當下情況，即時啟動自動駕駛，以確保行車的用路安全；見臻科技則運用了「眼動追蹤」（Eye Tracking）技術，導入智慧眼鏡，並進行各種應用；快樂島公司則將 IoT 產品與 App 結合，吸引越來越多新創公司投入「揮汗」運動產業，打造出運動科技產業生態系。這些案例的成功，顯示我國數位環境的建置已日趨完善，DIGI⁺ 方案這幾年來的努力成果已逐漸浮現。

面臨新冠病毒疫情的爆發，除了抗疫相關科技有所進展外，自主隔離、在家辦公、上學也推動影音匯流技術的擴大應用，這也是對我國數位基礎環境的一次檢視。我們也期待當疫情陰霾過去，數位科技的應用會為我們的生活帶來更多的可能。

innovations to shine in the global arena.

A few notable projects this year include the AgriTalk Management System developed by AgriTalk, which utilizes technology to solve current agricultural challenges in Taiwan and implement precision management. The system not only safeguards the health of farmers, but also ensures food safety for the general public. In addition, AU Optronics has designed a smart mattress specifically for long-term care, which realizes the company's vision of remote care and is a perfect application of smart healthcare. Mindtronic AI, an AI unicorn, has developed an advanced autopilot technology that can be activated in a timely manner by collecting real-time parameters from the surroundings of a car. Ganzin Technology introduced eye tracking technology that can be used with smart glasses and has developed a variety of applications. Happy Island Tech integrated its IoT products with smart phone apps in a bid to attract more startups to join the sports industry and build a complete supply chain for the sports technology industry. The success of these businesses points towards the maturity of Taiwan's digital environment, and after many years of dedication, it is finally time to reap the fruits of labor from the DIGI⁺ program.

The recent COVID-19 outbreak has not only pushed the advancement of epidemic prevention technologies, but also led to an increase in demand for online streaming due to the necessity to self-quarantine, work from home, and learn at home. During these trying times, it is imperative that Taiwan reexamines its digital infrastructure. It is our hope that as we leave the dreariness of the epidemic in the past, the application of digital technology in our daily lives will be able to bring us better possibilities and a brighter future.

DIGI+ 政策發酵 新創環境已臻完備

台灣數位能量耀眼 CES

DIGI+ Program Helps Build a Mature Startup Ecosystem

Taiwan Stands Out at CES with Digital Competitiveness

作為全球最重要的消費性電子產業盛會，CES 不但是業界重量級廠商每年發表新產品的選擇，更是所有新創團隊展現實力的舞台。

As the most important event for the global consumer electronics industry, CES is not only the stage for industry leaders to showcase their new products each year, but also a platform where startups can display their strengths.

Earlier this year, 82 startup teams from Taiwan exhibited a variety of products at CES Eureka Park, under the banner of the Taiwan Tech Arena（TTA）. Led by Yuchin Hsu, Deputy Minister of the Ministry of Science and Technology（MOST）, TTA has impressed CES participants with its technological innovations that are both creative and practical. Of all the participating teams of TTA, 13 of them won the CES 2020 Innovation Awards, with the winning products centering around the four core values of Taiwan's DIGI+ Program: Development, Innovation, Governance, and Inclusion. Together, they have advanced the infrastructure, economic and social development of Taiwan to a new level.

Deputy Minister Hsu recalled that when he led TTA to CES for the first time three years ago, there were only 33 member teams, and most technologies were not commercialized yet. Only prototypes were brought to the exhibition. "However, this year, all of the products we showcased were ready for commercialization, and could most certainly solve the pain points encountered by the industry," he indicated.

The rapid growth of Taiwan's startups in such a short period of time is not by coincidence. It takes a mature ecosystem for startups to thrive. In 2016, the Executive

今年年初，由科技部許有進次長第三度率領的台灣科技新創基地（TTA）82 家新創團隊，就在 CES 的新創展區「Eureka Park」展出各種產品，創意與實用兼具的技術驚豔全場，最後 TTA 總計有 13 組團隊拿下 CES 的創新大獎，從這 13 組團隊的獲獎內容可以看出，都以我國 DIGI+ 政策的發展（Development）、創新（Innovation）、治理（Governance）、包容（Inclusion）四大核心精神，讓國家的基礎建設、經濟與社會等層面再次升級。

許有進次長回憶三年前第一次帶隊參加 CES 時，只有 33 組團隊，技術也還沒商品化，在現場能展出的只有原型（Prototype），「不過今年我們展出的產品，不但都可以商品化，而且都能確實解決產業所遇到的痛點。」

台灣新創團隊的能量能在很短期間爆發絕非倖致。新創團隊要順利成長，靠的是完善的環境。行政院在 2016 年開始推動數位國家 · 創新經濟發展方案（簡稱 DIGI+），

▲ 科技部率領 82 家新創團隊，前進 CES 的新創展區「Eureka Park」，更有 13 家團隊拿下 CES 官方的創新大獎。Led by the Ministry of Science and Technology, 82 startup teams from Taiwan exhibited their products at CES Eureka Park, with 13 of the teams winning CES 2020 Innovation Awards.

▲ 科技部政務次長許有進指出，因為國外新創團隊進駐 TTA，讓國內外新創團隊，透過技術的碰撞與交流，產生全新的創意火花。Deputy Minister Yuchin Hsu pointed out that as international startups have joined TTA, teams from both Taiwan and abroad are thus able to spark innovation through exchange of technologies and the collision of ideas.

全力強化軟體建設，建構有利數位創新的基礎環境，並增進數位經濟發展打造服務型數位政府，此一政策已在短短 3 年中，讓台灣的新創環境成型，友達光電董事長暨執行長彭双浪就認為，這幾年台灣的新創環境越來越完善。因此，近年來友達光電除了本業的顯示器產品外，也在新創領域投入大量資源，積極催生台灣新創獨角獸。

台灣具備四大面向新創優勢

DIGI+ 引導產學投入，再加上政府政策的支持，造就了新創榮景，所迸發出來的能量不斷衝擊產業，為台灣的產業發展注入活水，對於未

Yuan launched the Digital Nation & Innovative Economic Development Program （DIGI+）, which intended to enhance Taiwan's digital infrastructure, create a friendly environment for digital innovation, develop the digital economy, and build a service-oriented digital government. Within three years, the program has significantly facilitated the completion of Taiwan's startup ecosystem. Paul SL Peng, the Chairman and Chief Executive Officer of AUO, indicated that the startup ecosystem in Taiwan has become more complete in recent years, and therefore in addition to its core business of electronic display products, AUO has been investing enormous resources in fostering Taiwan's unicorn startups.

The Four Competitive Edges of Taiwan's Startup Ecosystem

With industry-academia collaboration projects led by DIGI+ and the support of governmental policies, the booming startup ecosystem has invigorated industrial development in Taiwan. Deputy Minister Hsu stated he was highly confident in future developments. In order for new startups to grow, talent, technology, market, and funds are essential. "Taiwan has competitive edges in all four of these elements," he added.

In terms of talent, both vocational and higher education institutions in Taiwan have cultivated countless graduates who have solid foundations of expertise while remaining humble and practical. As Mr. Peng indicated, the quality of being adventurous is in the blood of Taiwanese. "The impressive number of small and medium-sized enterprises in Taiwan shows that people here are enthusiastic about starting new businesses." The courage to step out of one's comfort zone in spite of challenges, coupled by the support of advanced technologies, has contributed to the momentous growth of Taiwan's startup ecosystem.

Speaking of technology, Deputy Minister Hsu explained that Hsinchu Science Park has been a tech hub since it was founded

來發展，許有進次長相當有信心。他表示新創團隊要能順利成長，人才、技術、市場、資金都要俱備，「這四大面向，台灣都有優勢。」

在人才方面，台灣無論是技職教育或高階學術機構所培養的人才，不但技術基礎深厚、身段柔軟踏實，彭双浪董事長認為，更重要的台灣人的血液裡原本就有冒險性格。「從數量龐大的中小企業數量就可以看出台灣人非常喜歡創業。」這種不畏艱難勇於踏出舒適圈的性格，加上產業深厚的技術，讓台灣的新創發展有了充足的動力。

談到技術面，許有進次長指出，在1980 年代成立的新竹科學園區，持續匯集台灣的技術能量，「竹科的產業聚落，群聚的不只是高科技產業，相關的材料、精密機械等產業也不斷往竹科靠攏，並且持續精進技術。」這些技術不但往更高端的方向走，同時也將應用觸角延伸到不同面向。既深且廣的技術特色，為新創業者提供了豐富多元的選擇。

市場部分，台灣的內需市場並不大，因此從台灣廠商從早期就放眼世界，提著一卡皮箱走遍全球各角落。這個做法也延續到政府的新創政策上。「當初成立 TTA 時，就計畫讓它與國外市場鏈結，成為全球新創的樞紐。」連續三年參加 CES，對國外買家曝光技術與產品只是其中一環，許有進次長表示，這三年來 TTA 一直有國外新創團隊進駐，同時也引進各國的加速器，除了讓國內外新創團隊透過技術的交流碰撞產生全新的創意火花外，也大幅提高國內新創的國際能見度，讓國外創投資金流入，同時解決市場與資金兩大問題。

科技向善
改變產業面貌

除了這四大優勢之外，TTA 的新創團隊能在這次的 CES 成為展會焦點的另一個原因，在於以 DIGI⁺ 訴求的發展、創新、治理、包容等四大核心為主軸，透過創新科技解決

in the 1980s. "Hsinchu Science Park is not just an industry cluster of high-tech companies. It has gathered materials and precision machinery industries to develop advanced technologies." What's more, these technologies are becoming more specialized and comprehensive at the same time, which have provided startups with diverse options.

Taiwan does not have a large domestic market, and therefore from a long time ago companies in Taiwan have been visiting places all around the world and expanding their business territory to international markets. Such a tradition has influenced the government's policies towards startups. "We established TTA in order to connect to the global market and position it as a major startup hub in the world." So far, TTA has participated in CES for three consecutive years, and exhibiting technologies and products to foreign buyers is just one of its ambitions. As Deputy Minister Hsu indicated, numerous startup teams have joined TTA over the past three years, and international startup incubators have been introduced. This has sparked innovation through the collision of ideas and technologies, and also helped local startups increase international visibilityand attract venture capital, solving the challenges of market and funds.

Tech for Good as the New Industry Ecosystem

In addition to the four competitive edges, another reason for TTA's success and attention in CES this year was its effort in solving everyday problems through innovative technologies. Based on the four core values of DIGI⁺: Development, innovation, governance, and inclusion, the effort of TTA fell in line with one of the key themes at CES 2020 - Tech for Good.

Tech for Good emphasizes improving the lives of mankind through technology, and most of the CES Innovation Awards TTA won fell into this category. This

人類生活的各種問題，這也與今年 CES 的主軸之一 Tech for Good（科技向善）相符。

Tech for Good 的意念是透過科技改善人類生活，這次 TTA 拿下的 CES 新創獎項，也都聚焦於此。在本次的「台灣優勢」單元裡，更特別挑選此次在 CES2020 中獲獎或是具特色的業者進行報導。像是農譯科技整合了物聯網、AI、生技三大技術，協助農民以有機無毒方式改善土壤；快樂島公司的免戴式防水耳機 MP3，兼具音樂播放與提供游泳數據功能，同時也打造運動科技產業生態系；至於見臻科技所研發的眼動追蹤技術，可以將 AR 與 VR 技術建置於智慧眼鏡中，與物聯網架構連結應用；而麥迪創則聚焦於車用領域，透過深度學習演算法判斷當下車輛狀態，由 AI 協助駕駛人，讓行車用路更安全。這些案例在在凸顯 DIGI⁺ 訴求的四大核心目標的正確性。

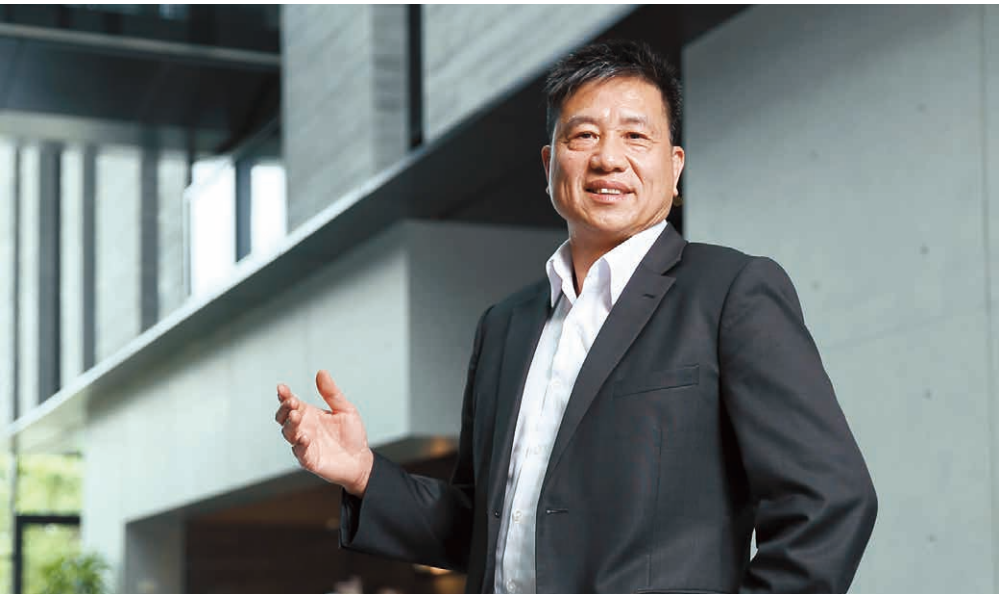
這些技術都是善用數據的力量，為世界創造更多福祉，而與現有的科技相較，其技術的應用型態也大不相同。「從今年的 CES 可以看到，全球科技已經進入 5G 與物聯網世代，新舊世代的最大差異就是應用層面截然不同。」彭双浪董事長接著表示，PC、手機……等多數消費性產品，都是少樣式的大量製造模式，不過在物聯網時代，科技已經走向場域經濟，其應用呈現碎片化，各產業之間的需求差異極大，其產品與系統必須貼身設計，因此這類市場的特色是既窄且深。

彭双浪董事長以友達光電為例，「這幾年我們開始轉型，公司的營運策略逐漸轉向場域經濟。」與過去專做泛用型硬體產品不同，場域經濟需要的不只是硬體技術，還必須具備特定領域的專業人才、生態系統、產業知識。「這些條件看似繁雜困難，不過其實台灣都有。」他進一步表示，台灣中小企業不只數量龐大，所涉及的產業類別也非常多元，而且各有其專業，只是這

quarter's Taiwan's Competitive Edge highlights the stories of award winners at CES 2020 and several special startups. For example, AgriTalk integrated technologies such as IoT, AI, and biotech to help farmers improve soil health in a toxin-free way. Happy Island Tech not only developed a new waterproof headset-free music player that could play music and record swimming data, but also helped build a supply chain for the sports technology industry. Ganzin Technology developed eye tracking technology and introduced AR/VR technology to smart glasses that are connected with the Internet of Things. Mindtronic AI focused on the automotive sector and created a deep-learning AI system to analyze real-time driving status and provide drivers with timely assistance, ensuring driving safety. The aforementioned cases represent the four core values of DIGI⁺.

These technologies leverage the power of data to create a better world. Compared with existing technologies, innovative technologies are applied very differently. "From CES this year, it is noticed that the world has entered the era of 5G and IoT. The biggest difference between the new and the old era is the way technologies are applied," Mr. Peng stated. He added that most consumer products, such as personal computers and mobile phones, are put into mass production with few design choices. However, in the era of IoT, technology has shifted its focus to domain economy. Consequently, the application pattern of technologies has become fragmented, and demands vary significantly across different industries. These innovative products and systems have to be customized, and thus their markets are usually narrow and deep.

Chairman Peng then took AUO as an example. "Ever since a few years ago, we have been transforming our business, and our operational strategies are leaning toward domain economy," he indicated. In the past, AUO supplied general purpose hardware products. To dive into domain economy, not only is hardware technology required, but also specialized talent and



▲ 友達光電彭双浪董事長指出，台灣的產業環境具備「斜槓特色」，不但擁有應用場域，也具備科技領域面向的專業，只要將技術充分結合，就能創造出其他國家難以企及的優 勢。Paul SL Peng, the Chairman and Chief Executive Officer of AUO, indicated that the industry ecosystem in Taiwan is a "slashie," since domains for application and expertise in technology can both be found here. Once these resources are integrated, Taiwan will be able to create competitive edges other countries cannot match.

些中小企業的的力量分散，每個從業者都只專注於自身產品，彼此之間並未連結，這也凸顯出台灣在物聯網世代的不足——垂直分工實力強勁，水平整合能力不足。「要解決這個問題，必須靠 DFSI（Domain-focused Solution Integrators, DFSI），也就是專精於特定場域的系統整合商。」

傳統系統整合商的運作方式，是整合市場上的硬體零組件，再加上自己轉寫的軟體，設計出消費者可用的產品，DFSI 的運作也是類似，不同的是 DFSI 必須具備特定領域的專業，挑選合適的硬體，並加上專為該使用者撰寫的軟體，例如友

knowledge of that specific domain/industry. "These requirements may seem complicated and demanding, but actually we can find everything we need in Taiwan." He then added that Taiwan has a large number of SMEs specializing in diverse fields. However, the powers of these enterprises are not concentrated, since many focus only on their own products and seldom forge partnerships with one another. This reflects the weakness of Taiwan in the era of IoT - strong vertical separation but weak horizontal integration. "To solve this problem, we need Domain-focused Solution Integrators（DFSI）, or namely system integration experts."

Traditionally, system integrators integrate existing hardware with software they write and produce usable products for consumers. This is similar to how DFSIs work. The major difference between the two is that DFSIs are equipped with domain-specific expertise, and they often have to select the appropriate hardware and write customized software for particular users. For instance, the smart mattress AUO designed for long-term care uses devices, such as sensors and controllers, that are in compliance with legal requirements. Furthermore, AUO wrote a program to observe patient behaviors and help healthcare providers keep track of the health status of care recipients. This product has improved the service quality and efficiency in the long-term care domain. "This is a perfect example of Tech for Good," Mr. Peng pointed out.

There are many problems that remain to be addressed in daily life. While the technology industry is able to solve these pain points, the prerequisite for creating a specialized system requires expertise in both technology and the domain of application. Mr. Peng believed that the industry ecosystem in Taiwan has this "slashie" feature. "For example, Taiwan is famous for both its healthcare and technology industries. If expertise in the two industries can be integrated, Taiwan will be able to create competitive edges other countries cannot match.

▲ 友達為長照系統設計的智慧床墊，就是「Tech for Good」的最佳案例。The smart mattress AUO designed for long-term care that is a perfect example of "Tech for Good".

Continual Efforts in Improving Digital Infrastructure

To further develop such competitive edges, technologies from the past alone are not sufficient. Taiwan's digital infrastructure has to be up-to-date. With the DIGI+ Program, Taiwan is taking steps towards establishing an environment with a complete digital infrastructure. In particular, AI/5G, digital transformation, and talent development are the three major policies of the program. Deputy Minister Hsu pointed out that the MOST formulated policies to develop artificial intelligence in 2017 and has invested a lot of resources in the construction of Taiwan's AI startup ecosystem. In addition, the ministry has built an R&D platform for AI and encouraged academic institutions to develop AI research projects. For the private sector, the Ministry of Economic Affairs has been promoting business transformation among SMEs in Taiwan. Furthermore, President Tsai Ing-wen has listed intelligent machinery in the central government's Five Innovative Industries Plan to facilitate the upgrade process of Taiwan's enterprises. For talent, in addition to the Three Arrows of AI Talent Development Plan proposed by the Executive Yuan, Taiwan AI

達為長照系統設計的智慧床墊，就是選擇符合長照法規的感測器、控制器等各種硬體設備，並撰寫軟體程式偵測病患行為，協助醫護人員掌握被照護者的狀態，提升長照場域的服務品質與效益。「這就是 Tech for Good 的最佳案例。」彭双浪董事長指出。

在生活日常中，類似的問題相當多，科技業確實可以解決這些痛點，不過前提是要同時擁有應用場域與科技領域兩大面向的專業，才能設計出合用且具特殊性的系統，彭双浪董事長認為，台灣的產業環境正具備這種「斜槓特色」。「例如台灣在醫療與科技兩大領域都有

▲ 麥迪創打造的人車共駕系統，正是利用 AI 的深度學習與感知能力來協助駕駛更安全。The human-machine cooperative driving system built by Mindtronic AI enhances driving safety through deep learning and AI perceptual capabilities.

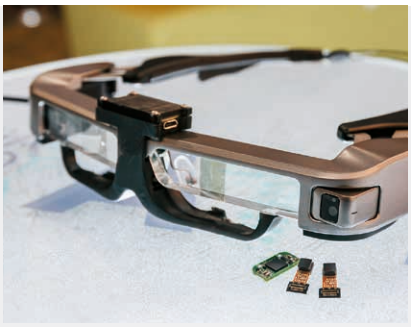
舉世聞名的深厚技術，這兩大技術如果能充分結合，就能創造出其他國家難以企及的優勢。」

持續強化數位基礎工程

不過要深化此一優勢，不能只依賴過去所累積的技術，台灣的數位基礎工程也必須與時俱進，在 DIGI+ 政策的推動下，我國的數位基礎建設逐步到位，其中又以 AI/5G、數位轉型、人才培育等三大政策最為亮眼。許有進次長指出，科技部在 2017 年開始執行的 AI 政策，投入大量資源，從不同面向營造台灣 AI 創新生態環境，同時逐步建立研發平台、支持學研界的 AI 創新研究計畫。企業方面，不但經濟部正在推動台灣的中小企業智慧轉型，蔡英文總統更將智慧機械納入五大產業創新政策之一，協助台灣企業升級。至於人才部分，除了行政院正在推動的「AI 人才衝刺三箭」政策外，中研院主導的台灣人工智慧學校在過去兩年也已經培育出 6,000 名產業 AI 精英，為台灣各產業的 AI 發展提供即戰力。

▲ AgriTalk 管理系統結合手機 App，讓農夫即時了解農地現況及農作物生長情形。The AgriTalk Management System uses a dedicated app to provide farmers with real-time information of their farm fields and crop growth.

從 2020 CES 的各種智慧科技與其相關應用可以看出，透過數位科技打造場域經濟，已然成為國家與產業提升競爭力的重要策略。在 DIGI+ 政策推動下，台灣的新創環境已臻完善，新創團隊的能量正逐漸釋放出來，隨著 5G 步入商轉，AI 應用快速普及，我國的 DIGI+ 也將再次升級，進入 2.0 階段，持續引領台灣產業升級，邁入全新的智慧化世代。



▲ 見臻科技使用感測器與特殊的的 AI 人工智慧演算法（eye processing unit）直接分析影像，眼睛只要有任何動作，馬上就可輸出眼動的方向或座標。Ganzin Technology analyzes images through sensors and special eye processing units. Eye movements will be captured immediately with real-time output of directions and coordinates.

Academy, an institution organized by Academia Sinica, has cultivated over 6,000 AI talents in the past two years, providing AI expertise to industries in Taiwan.

As can be seen from the smart technologies and their applications at CES 2020, developing domain economy with digital technology has become an essential strategy for countries and industries that aim to increase their competitive positions. With the DIGI+ Program, the startup ecosystem in Taiwan is close to perfection, and startup teams are on a steady growth. As 5G commercialization progresses and applications of artificial intelligence becomes more common, Taiwan's DIGI+ Program will enter the "2.0" stage to foster industrial upgrading and embrace a new era of smart technology.

▲ 音樂貝殼防水 MP3 耳機內建傳感器與快樂島公司研發的演算法，可辨識泳姿是否正確，還能換算划手次數、划頻、滑距等專業數據。With its built-in sensors and algorithms designed by Happy Island Tech, the waterproof Music Shell MP3 player can recognize swimming postures and monitor other data including the stroke count, stroke rate, and stroke length.

農譯科技跨域助攻 實現無毒智慧農業

AgriTalk to Pursue Toxin-Free Intelligent Agriculture with Cross-Disciplinary Collaborations

在產官學研各界的努力下，台灣的智慧農業遍地開花，其中更不乏從校園啟動的創新方案，農譯科技就是一群由交大人創立的新創企業，研發出「AgriTalk 管理系統」，專注在病害、蟲害、施肥、水分管理等面向，以科技實現精準管理，進一步守護農夫健康、全民食安。

Intelligent agriculture has achieved widespread success across a variety of fields in Taiwan with joint-efforts from the government, industry, academia, and research institutions. Among the countless successful startup cases, many of them originated from draft proposals on campus. As a perfect example of this, AgriTalk Technology Inc., a startup founded by National Chiao Tung University (NCTU), developed the AgriTalk Management System, which has exploited technologies to realize precision management of pest and disease control, fertilization, irrigation, and other aspects, in order to ensure the health of farmers as well as food safety for the general public.

交通大學生物科技系副教授
陳文亮
Wen-Liang Chen,
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Department of Biological
Science and Technology,
NCTU

行政院農業委員會自 106 年起推動智慧農業，在這股風潮下，農譯科技於 2019 年創立，透過科技解決當前台灣農業面臨的問題，其中的靈魂人物為交通大學生物科技系副教授陳文亮，身為雲林農家子弟的他，小時目睹父親噴灑農藥後倒下的驚悚畫面，在心中埋下了「對抗農藥」的種子。

農譯科技的起點，其實是創立於 2009 年的交通大學 NCTU_Formosa 團隊，在陳文亮的指導下，透過每年參與國際基因工程生物競賽 iGEM (International Genetically Engineered Machines competition) 累積實力，2014 年以藍光結合小型胜肽元件，研發專一性害蟲捕捉裝置，勇奪世界第三名的好成績。之後陳文亮更在 2018 年率領交大科技部價創計畫無毒智慧科技農業系統團隊，種植薑黃、生產「紅薑黃粉」，進一步落實理念。

農業需求出發 發展解決方案

台灣是世界知名的科技島，數位科技實力強大，科技可以幫助解決台灣農業面臨的從業人口老化、土壤酸化、農藥殘留等問題。然而，陳文亮強調，以科技解決農業問題的前提，首先必須跨領域對話，「應該要從農業需求端出發，真正做到使用者友善 (User Friendly)，也就是農民聽得懂、用得起、使用便利，才可能成功！」

除了陳文亮擁有農家子弟的加分背景外，農譯科技更在新竹寶山自設智慧示範農場，跨域整合生物科技、物聯網、人工智慧、農業等面向，實作所有解決方案，並要求同仁親自進入合作農友的案場，「當科技人與農夫一同作業至少一次，就能真切體會其中的困擾與問題癥結，才可能研發出到位的解決方案！」

AgriTalk 系統 IoT+AI 精準管理

正是因為貼近農業現場，農譯科技研發出「AgriTalk 管理系統」，囊括 (水質、土壤、益生菌) 分析技術、益生菌複合水肥、IoT 遠端監控環境、生物抑制劑、智能驅蟲

Since2017, the Council of Agriculture, Executive Yuan, has endeavored to develop intelligent agriculture. In 2019, AgriTalk was founded under this context, with a goal of addressing challenges facing the agricultural industry in Taiwan through technologies. Wen-Liang Chen, associate professor of the Department of Biological Science and Technology at NCTU, plays a central role in the team. Growing up in a farming family in Yunlin, Chen remembered seeing his father faint after spraying pesticide. Such a horrifying scene later on motivated him to fight against pesticides.

The origin of AgriTalk dates back to 2009, when NCTU_Formosa, one of the university's research teams, was established. Under the guidance of Dr. Chen, the team participated in the International Genetically Engineered Machines competition (iGEM) every year and made steady progress. In 2014, the team won third place in the competition with a selective insect trap utilizing blue light and small peptides. Later in 2018, another NCTU research team was assembled to create a green and intelligent agricultural system under the value creation program by the Ministry of Science and Technology. By leading the research team to grow turmeric and produce red turmeric powder, Dr. Chen took a further step and put his ideas into practice.

Solutions Developed Based on Agricultural Needs

Known to the world as a high-tech island, Taiwan takes pride in its advanced technology capabilities. While technology may help Taiwan solve agricultural challenges such as workforce aging, soil acidification, and pesticide residue, Dr. Chen indicated that a cross-disciplinary dialogue must be initiated before technology is applied to deal with agricultural problems. "Solutions should be developed based on agricultural needs,"he added. "They have to be user-friendly so that farmers can understand, afford, and implement these solutions with ease. This is the only way to ensure success."

In addition to benefiting from Dr. Chen's farming background, AgriTalk connected itself to the agricultural industry even more by establishing an intelligent demonstration farm in Baoshan, Hsinchu. The farm integrates knowledge of biotechnology, the Internet of Things, artificial intelligence and farming. Here, all solutions proposed have to

▲ 透過對各式感測器所蒐集農地環境數據的大數據分析與 AI 學習訓練，AgriTalk 管理平台可精準調控病害、蟲害、土壤肥力、水份 / 濕度、溫度及光照等。
The AgriTalk Management System conducts big data analysis and AI training with farm-relevant data collected by its monitoring sensors. Hence, the system is able to provide precision management possibilities on plant disease and pest control, soil fertility, moisture, temperature, and light.

燈與防蟲隔離網等多元解決方案。以 IoT 遠端監控環境為例，就擁有即時收集環境參數、建立專屬資料庫、害蟲預測系統 - 捕蟲罐、病蟲害預測系統等功能。

農譯科技運用感測器收集包括害蟲數量、溫濕度、紫外線、風速及雨量等農地資訊，透過物聯網技術連結上述數據，利用雲端建立的各項 AI 調控模型，提早 3-7 天預測控制作物生長狀況，精準管理蟲害、病害、土壤肥力、水份、光照、溫度等六大主題，並結合手機 App，讓農夫即時了解農地現況及農作物生長情形，只要手指滑一滑，就能遠端遙控，開關灑水系統或驅蟲照明燈等，輕鬆管理農地，還能夠搭配監視器，隨時監控農地實況，無須整日守在現場。

由於堅持不使用農藥，又必須防治蟲害，農譯科技團隊從蜘蛛毒蛋白中，篩選能驅趕果菜園中害蟲的蜘蛛蛋白，製成無毒農藥 Pantide，可以防治 80% 害蟲。團隊還親自養蟲、萌發孢子，設定土壤、微生物等各式條件，一步步累積數據庫，建立出一套公版系統，之後應用在實際農地場域時，更要不斷校正、量身打造。

無農藥高品質 高經濟作物打頭陣

目前「AgriTalk 管理系統」已率先導入白草莓、薑黃、蕈菇、蘭花、中草藥等高經濟作物，其中更以薑黃為代表產品，打破傳統薑黃必須

be tested on site before actual application. Furthermore, all team members are required to visit the farms of partner farmers personally. "Only when technology experts work together with farmers can they accurately find the pain points in agriculture and come up with practical solutions,"Chen indicated.

The AgriTalk System: Precision Management Made Possible with IoT & AI

With its proximity to farm fields, AgriTalk developed the AgriTalk Management System, which provides diverse solutions such as an integrated analysis technique for water, soil, and probiotics, a composting method with probiotics and manure, an IoT-driven remote monitoring system, biological inhibitors, intelligent pest repellent lamps, and insect-proof nets. The IoT-driven remote monitoring system, for example, features real-time collection of environmental parameters, custom database creation, pest control with insect traps, and a prediction system of plant diseases and pests.

In specific, AgriTalk collects farm-relevant data such as pest population size, temperature, humidity, ultraviolet light, wind speed, and precipitation through its monitoring sensors. These data are further integrated with IoT technologies and cloud-based AI modules, making it possible to predict and control the growth of crops 3-7 days earlier. The system offers precision management possibilities on six parameters: pests, diseases, soil fertility, moisture, light, and temperature. Furthermore, a dedicated app is available to provide farmers with real-time information of their farm fields and crop growth. By simply swiping their fingers on the screen, farmers can adjust the irrigation system and pest repellent lamps from afar. The remote monitoring system can also be used together with surveillance cameras to check out farmland anytime, anywhere, saving farmers the trouble of staying on their farms for the entire day.

With the adherence to the ideal of tackling plant pests without the usage of traditional pesticides, the team utilized pest-repelling spider protein to develop a toxin-free repellent called Pantide, making it possible to deal with 80% of plant pests. What's more, the team has even grown insects and spores on the demonstration

「種 1 年休 3 年」的模式，不但能夠年年耕種、保持土壤不酸化，經由中興大學及瑞士通用檢驗公證集團 SGS 檢測，證實無農業殘留、無磷化物及無重金屬含量，薑黃素含量更是一般薑黃的 5 倍！

導入「AgriTalk 管理系統」的示範農場越來越多，例如新竹五峰農場、板橋中華電信學院「羅丹智慧農場」等，就連在西亞的亞美尼亞都加入無毒栽種的行列。農譯科技也計畫在苗栗縣南庄鄉設置示範場域，預計吸引十位青農返鄉種植薑黃，採取保證收購的策略，保障青農的基本收入，一舉改善農村高齡化、青年就業、農藥殘留等多元問題。

跨域轉譯整合 擴大應域領域

「對於農友來說，從現場手動的開關到手機直接操控，就是一個很大的門檻，牽涉到預算投入、成本考量。」若是以 1.0 機械化，2.0 電氣化，3.0 自動化，4.0 智慧化來談，陳文亮認為，目前台灣的農業現場僅能稱得上是 2.5 半自動化狀態，大多的農地就只是導入定時器而已，台灣光是在自動化就還有很大的進步空間，而自動化的推廣首先必須從例如蘭花、蕈菇等高經濟、高知識的農業領域著手。

展望未來，農譯科技將朝向以下三大面向發展，第一，透過契作農戶與自耕農，推廣「AgriTalk 管理系

▲ 新竹五峰農場在交通大學無毒智慧科技農業系統 (AgriTalk) 團隊的努力下，以對環境友善的堅持為主軸，打造了全台灣最高的智慧農場。Founded by AgriTalk from NCTU with the core vision of being environment friendly, the farm in Wufeng, Hsinchu is the highest intelligent farm in Taiwan.

farms and adjusted variables such as soil and microbes, with an aim to accumulate data and build a standard model. The system is required to be constantly calibrated and adjusted after being introduced to real farm fields.

Pesticide-Free Farming with Cash Crops Taking the Lead

The AgriTalk Management System has now been introduced to the growth of cash crops such as white strawberries, turmeric, mushrooms, orchids, and Chinese herbs. In particular, a significant progress on turmeric has been seen. Traditionally, a turmeric farm has to lie fallow for three years after one year of work. The new technology, however, allows farmers to grow turmeric every year without rotation and avoid the risk of soil acidification. Furthermore, the turmeric grown has been proved to be free of pesticide residues, phosphides, and heavy metals and contain five times more curcumin, according to tests conducted by National Chung Hsing University and Société Générale de Surveillance (SGS).

Currently, an increasing number of farms have adopted the AgriTalk Management System and implemented toxin-free agriculture. Examples include a farm in Wufeng, Hsinchu, and the Rodin Intelligent Farm at CHT School in Banqiao, New Taipei City. Even in the Republic of Armenia, a faraway country in Western Asia, farmers have also participated in toxic-free farming. In addition, AgriTalk is planning to establish another demonstration farm in Nanzhuang, Miaoli. The farm is expected to attract ten returning young farmers to plant turmeric. Procurement of the turmeric will be guaranteed to ensure the basic income of these young farmers. This strategy aims to deal with issues such as aging farming population, youth employment, and pesticide residues.

Integration of Cross-Disciplinary Technologies to Expand Application Scope

"For farmers, replacing manual switches on the farm field with digital ones on smartphones is already a high entry barrier,"Dr. Chen indicated. "This has a lot to do with budget and cost limitations."he added that in the four stages of industry evolution, namely Industry 1.0 (Mechanization), Industry 2.0 (Electrification), Industry 3.0 (Automation), and 4.0 (Intelligent

統」，在農地落實不使用農藥的耕作方式；第二，持續與廣達電腦合作，為農夫提供品質優、價格合理的感測器，推動農業自動化；第三，因應108課綱跨領域學習的精神，結合生物科技、物聯網、人工智慧等跨領域資源，在教育現場推廣理念，期待下一代能夠接棒，杜絕農藥的使用，實現無毒農業願景。未來陳文亮也將透過標準化、模組化等方式，在智慧醫療、智慧城市等其他產業領域，複製農譯科技的成功經驗。

陳文亮認為，農業要智慧化，跨領域的轉譯、整合最為重要，農委會、科技部等各政府單位都已經持續推動智慧農業，而政府單位在鼓勵產業投入智慧農業的做法上，陳文亮建議，必須從農業需求端出發，擬定出策略創造土地保有地力、農民高效健康務農、產業業者獲利等三贏！他也強烈建議所有有心想投入智慧農業的團隊，必須與農民對話了解需求，並且自設農場、實踐研發細節，真正做到「接地氣」！

▲ 交大農譯科技團隊之無毒智慧科技農業系統榮獲 2019 未來科技獎。2019 未來科技獎。
The team of AgriTalk from NCTU won the 2019 FutureTech Breakthrough Award with its toxin-free intelligent farming system.

Production), Taiwan is merely at Stage 2.5 (Semi-automation) since the most advanced device on a farm field now is perhaps a timer. There is still much room for improvement before automation is actually achieved in Taiwan. To begin with, he stated, the development of automation should start from cash crops or knowledge-intensive agriculture.

Looking ahead, AgriTalk has proposed a three-pronged development strategy. Firstly, the team aims to introduce the AgriTalk Management System to both contract and independent farmers to advocate farming methods that use zero pesticides. Secondly, the team will continue its partnership with Quanta Computer to provide affordable, high quality sensors to farmers to promote automated agriculture. Finally, in response to the 12-Year Basic Education Curriculum, which encourages cross-disciplinary learning, the team will continue to integrate resources from fields including biotechnology, the Internet of Things, and artificial intelligence to publicize its core values in schools, in hope that the young generation will take the responsibility one day to achieve the vision of toxin- and pesticide-free agriculture. Meanwhile, Dr. Chen's next step forward is to replicate the success of AgriTalk in fields such as intelligent medicine and intelligent city through standardized and modular methods.

The key success factor for intelligent agriculture, according to Dr. Chen, is the integration of cross-disciplinary technologies. As of now, governmental agencies including the Council of Agriculture and the Ministry of Science and Technology have been proactively developing intelligent agriculture. He suggested that government policies should center around the needs of agricultural stakeholders to ensure the sustainability of farmland, the health and performance of farmers, and the profitability of the industry, creating a win-win for all. In addition, he called on future teams interested in intelligent agriculture to remain "local-need-oriented"by always communicating with farmers to understand their needs, building self-owned demonstration farms, and putting research results into practice.

見臻科技推 AI 演算眼動追蹤解決方案

搶搭下一波 AR/VR 全球商機

Ganzin Technology Embeds Artificial Intelligence into Eye Tracking Solutions

Targeting the Next Wave of Opportunity for AR/VR

見臻科技創辦人兼執行長
簡韶逸 博士
Dr. Shao-Yi Chien,
the founder/CEO of Ganzin Technology

《鋼鐵人》使用眼睛操控技術，在現實世界中已經問世。新創公司見臻科技所開發出的「眼動追蹤」（Eye Tracking）技術，歷經 5 年不斷改良，已經趨近成熟。創辦人兼執行長簡韶逸博士表示，該套系統目前洽詢廠商很多，今年應該可以完成導入，預計明年就可量產上市。

The operation technology in Iron Man, in fact, has been realized in recent years. The eye tracking technology developed by Ganzin Technology, a startup from Taiwan, has reached maturity after five years of continual improvements. Shao-Yi Chien, Ph.D., the founder/CEO of the startup, indicated that many companies are interested in the new eye tracking system, and mass production is estimated to be available next year, following the completion of the introduction stage this year.

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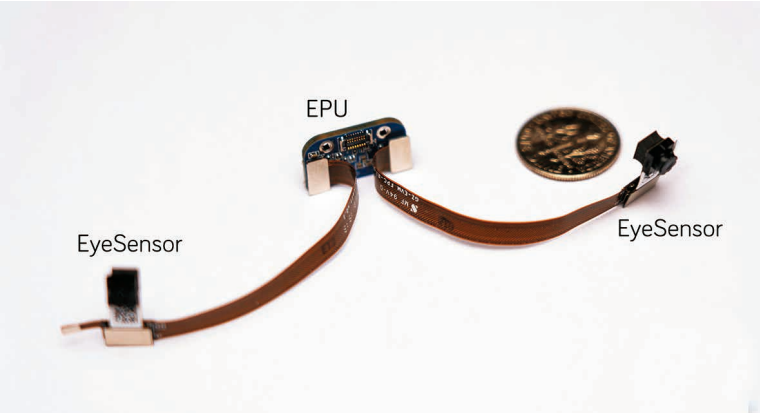
「眼動追蹤技術可得知使用者的眼睛正在關注什麼地方。」簡韶逸展示眼動追蹤關鍵的迷你晶片與兩小顆感測器。「這套眼動追蹤解決方案主要針對 AR（擴增實境）與 VR（虛擬實境），可導入智慧眼鏡，並進行各種應用。」簡韶逸與團隊開發的整套模組，從感測器到晶片全部 MIT。



▲ 由迷你晶片與兩小顆感測器組成的整套模組，全部 MIT。A module consisting of one microchip and two sensors. 100% made in Taiwan.

導入 IoT 物聯網 眼動追蹤技術 解放雙手

眼動追蹤讓眼睛成為操作介面，釋放雙手。簡韶逸舉例，過去操控電腦使用鍵盤與滑鼠，智慧型手機面世後，改為手指觸控，下一個世代搭配 AR/VR 裝置，最適合的操作

The operation technology in Iron Man, in fact, has been realized in recent years. The eye tracking technology developed by Ganzin Technology, a startup from Taiwan, has reached maturity after five years of continual improvements. Dr. Shao-Yi Chien, the founder/CEO of the startup, indicated that many companies are interested in the new eye tracking system, and mass production is estimated to be available next year, following the completion of the introduction stage this year.

"The eye tracking technology is able to tell where the user's eyes are focusing." Dr. Chien demonstrated a mini chip and two small sensors, which are the key items in the eye tracking system. "This eye tracking solution is specifically designed for AR (augmented reality) and VR (virtual reality) products. It can be introduced to smart glasses for a variety of applications." In fact, the entire eye tracking module developed by Shao-Yi Chien, Ph.D. and his team, including the sensors and chips, is all made in Taiwan.

Eye Tracking Technology to Replace Hand-operated Interface with IoT

The hands-free eye tracking technology makes it possible to use our eyes as the new user interface. Dr. Chien explained that the user interface for computers is a keyboard and a mouse, while for smartphones, it's a touch screen. For the next generation AR/VR devices, the best user interface should be our eyes. For example, if you want to turn on the lights when you get home, all you need is one look at the ceiling. "After the miniature eye tracking module is placed on a pair of smart glasses, it can be connected to the IoT network. We believe that in the future such technology can be applied in a diverse sectors, such as daily life, healthcare, and entertainment."

Five years ago, Shao-Yi Chien and his research team, Media SoC Design Laboratory, created the first generation of eye tracking technology. Following the achievement, he decided to found a startup to commercialize the product. However, it was not an

介面就是眼睛。舉例來說，回到家開燈，只需眼睛往天花板一看，就可讓燈具成功開啟。「智慧眼鏡導入創新微型眼動追蹤模組後，就可直接與 IoT 物聯網互動，相信未來在生活、醫療、娛樂等場域中，落地的應用相當廣泛。」

5 年前簡韶逸與領導的學術團隊「媒體晶片系統實驗室」，開發出第一代的眼動追蹤技術，有了一定的成績後，毅然決定開設新創公司，將研發產品進行商品化。沒想到開發之路相當波折，實驗室中的完美數據要導入業界時，必須面臨很大的挑戰。

▲ 這款「眼動追蹤」（Eye Tracking）技術，可以在許多領域（例如 AR / VR）啟用眼動追踪功能。The eye tracking technology can be applied to many technological fields, such as AR/VR.

easy process converting perfect research data into viable products.

"While we can produce high precision products, our customers may care/expect something more." To make a product suitable for all users, there are technical barriers to overcome, including the differences of eye color, ethnicity, and the length of eyelashes. However, the pain points of customers are more than these: Is the product easy to install? Is it easy to integrate the product with other devices? Is it stable? Just to name a few.

When converting simulation results into physical chips, "Many details have to be modified. There is a huge gap between designing an algorithm and deploying it on a chip." Dr. Chien had to continue discussing with customers and learn from the process. With the support of the Industrial Value Creation Program for Academia by the Ministry of Economic Affairs, the energy-saving, small, high-performance, and AI-integrated eye tracking solution was finally created after five years of efforts.

Zero-lag Microchip Reduces Hardware Requirements for VR

While there are numerous manufacturers in the eye tracking market, the eye tracking module developed by Gazin Technology is considered the easiest to install by most AR/VR providers. The advantage of the module lies in a special algorithm that provides fast and accurate eye tracking possibilities. Currently, most eye tracking modules use multiple LED light bulbs to illuminate users' eyes, capture the light reflected back, and track eye movements through complicated mechanisms. Gazin Technology, however, chose to go back to the basics and analyze images through sensors and special eye processing units. Any eye movements will be captured immediately with real-time output of directions and coordinates and practically no recognition lag.

In addition, accurate eye tracking helps reduce the processing time needed for VR foveated rendering. "Human eyes can only see one point in an instant, which takes up 2% of total signal input, and the other parts are blurred." Dr.

「我們可以把準度做到相當精準，客戶在乎的，卻可能是其他事情。」眼睛的顏色、人種國籍、睫毛長度不同，讓所有人都可以使用，光符合這幾項需求，就有相當難度。客戶在乎的還包括是否容易安裝？整合容不容易？夠不夠穩定？都是客戶在乎的痛點。

軟體驗證成果轉為實體晶片，「這中間的介面都得重新定義，從一個軟體的演算法到晶片的定義，差距蠻大的。」簡韶逸只能與客戶不斷往來修正，從中學習經驗，並依靠經濟部的價值創造計畫，花費五年時間，才誕生目前這套省電、體積小、高速運算，且利用 AI 人工智慧演算的眼動解決方案。

微型晶片演算 無延遲 降低 VR 門檻

坊間不乏從事眼動追蹤技術的廠商，見臻科技的眼動追蹤模組，可說是 AR/VR 廠商目前公認最好安裝的系統，其優勢在於特殊的演算法，讓眼動追蹤更精準、更快速。坊間廠商必須使用多顆 LED 燈反射眼球，利用複雜的機構才能追蹤眼球，見臻科技則反璞歸真，使用感測器與特殊的的 AI 人工智慧演算 法（eye processing unit）直接分析影像，眼睛只要有任何動作，馬上就可輸出眼動的方向或座標，辨識上可做到幾乎沒有延遲。

眼球精準的追蹤更可節省 VR 繪圖中，注視點渲染技術的運算時間。「人類眼睛在瞬間只能看到一個點，大約佔 2% 的訊號，其他部分是模糊的。」簡韶逸指出，在智慧眼鏡中安裝自家晶片後，當下就可知道眼睛在看哪裡，「此時就可以只運算眼睛注視的那一塊，至少可以節省十倍以上的運算時間。」運算速度的大幅提升，將可帶來很多好處。例如玩家使用手機就可玩到高階的 VR，大量降低 VR 硬體的門檻。

數位人才易被挖角 產官學攜手留才 當務之急

簡韶逸認為，台灣具備完整的上下游供應鏈，對從事硬體創業這條

▲ 眼動追蹤模組不僅支持室內和室外使用，而且耗電量低，因此只需充電一次即可全天候工作。The energy-saving eye tracking module is made for both indoor and outdoor usage, with an all-day run time from a charge.

Chien pointed out that smart glasses can track eye movements once the company's module is installed. "With the module, we can just process where the eyes are focusing. The processing speed will increase at least ten times." Such a substantial boost can bring many benefits. For example, players will be able to enjoy demanding VR games on their smartphones, meaning hardware requirements for VR has been significantly reduced.

Talent Retention Being the Most Urgent Issue

Shao-Yi Chien indicated that Taiwan has a complete supply chain, which is a great advantage for hardware startups. "We have a well-developed environment," he added. However, when it comes to

路有很大的幫助，「產業環境很完整。」但是提到數位創新人才這一塊，則認為必須有政府的支撐，才可能熬過新創期。例如自己的公司，就是因為有經濟部的價值創造計畫，才能讓最前瞻的技術能夠面市，再者也是依靠該計畫的資金挹注，才能留住優秀人才。「不然我的學生都是台大電機系畢業，都是工作來找他們，沒有這個計畫，我也很難留住我的學生。」

2025 年全球的 AR/VR 市場預計上看 800 億美元，未來 AR 與 VR 必定會是繼手機之後，下一個新的隨身裝置，簡韶逸相信，台灣若可掌握住其中軟硬整合與眼動追蹤的關鍵技術，必定能大有可為。

▲ 眼動追蹤模組的設計為見臻科技贏得了許多獎項，例如 InnoVEX 2019 的 Qualcomm 創新獎和 CES 2020 創新獎。The eye tracking module has won Ganzin Technology several awards, including the Qualcomm Innovate in Taiwan Challenge at InnoVEX 2019 and the CES 2020 Innovation Awards.

the cultivation of digital innovation talent, government supports are much needed for startups to survive the initial stages. Take his company for example, Dr. Chien pointed out that without the supports from the Industrial Value Creation Program for Academia by the Ministry of Economic Affairs, they wouldn't have made it to launch the cutting-edge technology and retain outstanding talent. "My students are all graduates of the Department of Electrical Engineering of National Taiwan University. Many companies are competing to recruit them. Without the program, I wouldn't have made it to retain them."

The global AR/VR market value is projected to reach $80 billion in 2025, and AR/VR devices are expected to be the next generation of portable devices after smartphones. Shao-Yi Chien believed that the future for Taiwan's industry will be promising as long as it seizes the key technologies for software/hardware integration and eye tracking systems.

麥迪創新創 AI 技術提供智慧行車解決方案

AI 深度學習提升人車共駕安全性

Mindtronic AI Providing Intelligent Driving Solutions Through Innovative AI Technology

AI Deep Learning Enhancing the Safety of Human-Machine Cooperative Driving

麥迪創人工智能執行長
江昱嫻
Sharon Jiang,
the CEO of Mindtronic AI

來自台灣的麥迪創以最新的人工智慧技術研發奪得 CES 2019 創新獎項，以人機應用打造更好的智慧駕駛體驗。

Taiwan-based Mindtronic AI won the CES 2019 Innovation Award for its latest artificial intelligence technology which creates a better intelligent driving experience with human-machine interfaces.

2017 年成立的麥迪創人工智能（Mindtronic AI），不到短短 2 年時間，就已在備受矚目的美國拉斯維加斯 CES 2019 消費電子展拿下兩項大獎，包括汽車座艙影音（In-Vehicle Audio/Video） 以及智慧汽車與自動駕駛（Vehicle Intelligence and Self-Driving Technology），展現在智慧汽車領域的前瞻技術。

科技人才密度高 研發基地落腳台灣

短時間內異軍突起，其實麥迪創在成立之前，早就深耕創新的人工智慧技術，並將研發重心設在台灣。執行長江昱嫻坦言，研發中心設在台北，一方面看重台灣在電子電機產業的深厚基礎，其次是軟體資訊人才密度夠高，專業人員的研發專注力很強，因此秉持著回饋台灣社會的想法而選擇加碼投資台灣。

麥迪創在 CES 2019 上大放異彩，其創新應用不少是獨步業界的獨角獸型技術。「我們的 AI 技術，主要是讓車輛行駛時更安全。」例如一般駕駛在行車時，常會有俯身撿拾物品或播放音樂等分心行為，麥迪創的 AI 深度學習技術能夠判別當下情況，隨即啟動自動駕駛，以

▲ DIRIGENT AI 智慧座艙能以眼球與手勢控制包含儀表、中控台、HUB 等屏幕，達成駕駛人如指揮家般操控車用空間多屏幕互動。In the DIRIGENT AI cockpit, drivers can control the interfaces such as dashboard, center console, and HUB with eyes and gestures, so that they can interact with multiple screens like a conductor to control the car space.

Founded in 2017, Mindtronic AI has already won two awards at the high-profile consumer electronics show,CES 2019, in Las Vegas, USA in the span of two years. The two award categories, In-Vehicle Audio/Video and Vehicle Intelligence and Self-Driving Technology, demonstrate Mindtronic AI's forward-thinking technology in the smart automobile industry.

An R&D Base with High Density of Technological Talent

Seemingly appearing out of the blue, Mindtronic AI has in fact been working on innovative artificial intelligence technologies long before its founding from its R&D node in Taiwan. Chief Executive Officer Sharon Jiang candidly confessed that the R&D center is located in Taipei on one hand due to the solid foundation of the electrical and electronic industry in Taiwan. On the other hand, there is a sufficient selection of software and information technology talents with professionals concentrating primarily on R&D. As a result, Mindtronic AI chose to increase investment in Taiwan with the notion of giving back to the community.

At CES 2019, Mindtronic AI made a splash with many of its innovative applications of its unicorn technologies unique to the industry. "Our AI technology is primarily about ensuring the safety of vehicles while they are in motion." For example, it is common for driversto be distracted while leaning down to pick up something or while playing music. With AI deep learning technology, Mindtronic AI can identify situations and instantly activate the autopilot to ensure safety while driving. The AI system

確保行車的用路安全。這套系統也能識別出使用者的身份，並經由人工智慧來進一步來學習進化駕駛的習慣，配合機器視覺與先進的駕駛輔助系統，讓車子的反應能更貼近駕駛的習慣。

駕駛座的操作便利性、安全性透過 AI 系統可以變得更聰明，麥迪創的企業品牌 Slogan 是「讓人人都變成舒馬克」，打造的人車共駕系統，正是利用 AI 的深度學習與感知能力來協助駕駛更安全，即使駕駛的技術不佳，「還是可以利用科技補強到車神的等級。」江昱嫻打趣比方。

▲ Noah AI 智慧平台能使智慧座艙進行高度整合，並具備多螢幕高速串流交互和生物識別技術所打造的 3D 人機介面 (HMI)，以及藉由 ADAS 和 DMS 信號融合所打造的人車共駕系統，證明麥迪創的深度學習框架 (DNN) 與平台在車用市場上的無限潛力。Noah AI platform enables a highly integrated smart cockpit with 3D HMI of multi-screen high-speed streaming and biometrics, as well as a human-machine cooperative driving system of ADAS and DMS, demonstrating the unlimited potential of Mindtronic AI's DNN and platform in the automotive market.

can also differentiate between drivers and adapt to their driving habits. Through machine vision and an advanced driver assistance system, the car is able to respond better to different driving habits.

The ease of use and safety of the driver's seat can be made even smarter through anAI system. Mindtronic AI's slogan is "Anyone Can Be Schumacher". The human-machine cooperative driving system was made to make driving safer through the assistance of deep learning and spatial capabilities of AI. Even if a driver is bad at driving, the person could still drive like a legendary racer with the help of technology, Sharon Jiang joked.

Human-Machine Interaction Creating User-friendly Driving Experiences

Mindtronic AI's other award-winning technology, Human Machine Interaction, simplifies the menu interface of complex smart car systems. "We use technologies such as palm scanning or eye tracking to automatically switch to a user's preferred profile, including favorite music, air conditioning temperature, and more, when they put their hands on the device. To boil it down, this increased interaction between humans and machines is basically just simplifying complex dashboard operations." The more intuitive operations are not only easier to pick up, but makes the whole driving experience more comfortable while improving the safety of driving.

Biometrics identifiers with deep learning capabilities can also be applied to driver monitoring systems of taxi and bus companies. Biometric scanners can be used to analyze whether a driver is blinking, yawning, active, and aware of the road to determine when dangerous driving occurs and can wake-up the driver or provide alert notifications.

Gathering the Best Talent for the R&D of Innovative Technologies

A crucial part of artificial intelligence is the so-called deep

人機互動
應用 HMI 駕駛體驗更加人性化

另一項獲獎技術人機互動應用（Human Machine Interaction，HMI），則是把複雜的智慧車載系統選單介面簡單化。「我們使用掌紋辨識器或眼球追蹤等技術，讓不同使用者手掌移到裝置上，就可自動切換到該名使用者喜愛的音樂、冷氣溫度等介面，增加人機間的互動性，基本上就是把複雜的儀表板操作簡化。」更加直覺的操作使用除了讓駕駛使用起來更上手，整個行車體驗也能更舒適，並提高行車的安全性。

具有深度學習能力的生物辨識技術，也可應用於車隊、客運公司所需的駕駛監控系統，藉由生物辨識技術來分析駕駛是否有眨眼、打哈

▲ 來自不同背景與文化的團隊，讓麥迪創的創意無限，進而開發出更好的應用與服務。Members from various backgrounds and cultures bring unlimited creativity to Mindtronic AI developing more suitable applications and services.

learning. The artificial intelligence learning technology of Mindtronic AI is based on a learning framework called BCNN, an exclusive system designed specifically for AIoT and autopilot deep learning frameworks. Sharon Jiang pointed out that current similar learning frameworks around the world include Google's TensorFlow, which people are familiar with, and PyTorch from Facebook. "The companies that have been able to develop these learning frameworks are almost all large international companies, and we are the sole company with a learning framework in the Chinese community." Mindtronic AI's BCNN is primarily used in automobiles and low-energy consumption devices. It took Mindtronic AI five years to develop the framework. The key to its creation is thanks to

欠、活躍程度，及對道路感知的能力，以此來判斷是否有行車危險，做到即時喚醒或警示通報。

匯聚各國菁英人才 科技應用研發創新

在人工智慧當中，非常重要的一環是所謂的深度學習。麥迪創的人工智慧學習，主要建立在稱之為 BCNN 的學習框架，這是專門為 AIoT 與自動駕駛深度學習框架而設計的獨家系統。江昱嫻指出，目前國際上的相關學習框架包括大家耳熟能詳的 Google TensorFlow 與 Facebook 的 PyTorch，「能夠推出這些學習框架的，幾乎都是國際級的大公司，在華人區只有我們有這樣的學習框架。」麥迪創的 BCNN 主要用於汽車以及低能耗的裝置，麥迪創花費整整五年才研發這套框架，其中的重要關鍵，在於麥迪創有著來自八個國家，四十多位不同領域的專業技術人員。

這群專業人員平均資歷超過 10 年，各自有不同的背景與文化，平時在科技新創上更能激發出火花，因而更能掌握不同地區使用者的習慣，開發出更好的應用與服務。

站穩腳步 台灣科技能力 展優勢

目前智慧汽車領域是各家新創公司的兵家必爭之地，台灣若要發展智慧汽車，除了有先天的科技人才優勢，數位基礎建設也已經準備妥當。「台灣的數位基礎工程，放眼世界早已經做到南波萬。」江昱嫻斬釘截鐵表示，不過智慧汽車的投資門檻相當高，她建議新創公司可多與歐美一線大廠合作，在技術上共同整合，如此才能搶得先機。

「台灣明明就跟整個世界接壤，心態要更開放。」如果能夠調整心態，了解自身優勢，台灣在智慧行車領域，不管是在 AI 研發、製造、零售都能貢獻己力，成為整個世界供應鏈的一部分。

the combined efforts of more than 40 technical professionals from different expertises, spanning eight countries, all working together at Mindtronic AI.

Averaging more than 10 years of experience over various backgrounds and cultures, the group of professionals at Mindtronic AI are able to draw inspiration from their experiences for new innovative ideas in technology. The different backgrounds and cultures also allow for better understanding of the habits of users in different regions to develop more suitable applications and services.

A Steady Start for Taiwan to Show Its Technological Competence

Presently, the smart car industry is a battleground littered with startup companies.. If Taiwan plans on developing smart cars, in addition to the inherent advantage of its technological talent, the digital infrastructure is also in place. "Taiwan's digital infrastructure is top of the world," Sharon Jiang stated firmly. However, the investment threshold for smart cars is quite high. Jiang suggests that startups can cooperate with more first-tier manufacturers in Europe and the United States,integrating their technology to get a head start.

"Taiwan is clearly already connected to the world. People in Taiwan just need to be more open-minded." If we can change our mindset and understand our strengths, Taiwan can surely contribute to the smart car industry. No matter if it is through research and development of AI, manufacturing, or retail, Taiwan can become a part of the world's supply chain.

快樂島整合 AI 游泳辨識與骨傳導聲學技術

搶進游泳智能耳機商機

Happy Island Tech Integrates Gesture Recognition with Bone Conduction Technology

A New Business Opportunity for Waterproof Smart Earbuds

擺脫防水耳機容易遺失的困擾，快樂島公司研發免戴式防水耳機MP3，整合游泳愛好者與專業訓練者社群，打造自有的運動生態系。

To save the hassle of losing waterproof earbuds, Happy Island Tech introduces the brand new waterproof headset-free music player that targets the community of both swimming lovers and professional swimmers and creates an exclusive sports ecosystem.

快樂島公司執行長 黃俊穎
Jordan Huang,
the CEO of Happy Island Tech

想一邊游泳一邊聽音樂？享受在水下聆聽喜愛音樂的暢快感覺，目前坊間的防水型運動耳機或 MP3 都已經可以做到。目前市面上的防水運動耳機，都已具備長時間播放 MP3、長時間蓄電，防水防塵等功能，不過在游泳時，這類耳塞式耳機或無線型耳機容易掉落，造成使用者困擾，因此快樂島公司執行長黃俊穎特別研發出游泳專用的免戴式耳機，可把耳機套在頭後方或塞入泳帽，不用擔心游泳時遺失。

骨傳導技術 創新結合防水耳機

「游泳時，因為泳者的頭要左右擺動，也會有蹬牆、跳水等動作，因此耳機容易掉落。」熱愛游泳的黃俊穎，因為個人興趣而走上研發 IoT 物聯網智慧穿戴的創業道路，點出游泳者的痛點需求。

考量一般耳塞式耳機容易掉落，以及容易進水等問題，黃俊穎採用獨家骨傳導聲學技術，研發出音樂貝殼防水 MP3 免戴耳機，使用者把耳機別在頭部後方或塞入泳帽，就可在水下聆聽音樂。

▲ 游泳 MP3 音樂貝殼採用骨傳導專利設計，開放雙耳不傷耳朵，讓您無「線」享受水中音樂，維持運動強度。
Music Shell MP3 player features the patented bone conduction design. With your ears uncovered, you can enjoy the music wirelessly underwater while maintaining high-intensity swimming training.

音樂貝殼防水 MP3 耳機的骨傳導技術，可將中高音波透過震動傳遞至內耳神經，低音波則透過水的介質來傳遞，因此泳者即使沒有把耳機塞在耳朵內，在水下一樣能聆聽音樂，甚至因為有水的傳播，產生環場般的音效。此外，「這款耳機聲音有效傳遞距離在一米內，既不會傷害耳朵，也不會影響其他泳客。」

幫助泳者 建立運動數據

第二代音樂貝殼防水 MP3 耳機功能更加升級，透過語音提示可告知泳者游了多少時間、多少距離。「像我們喜愛游泳，游長途的人，一次下去可能游個兩、三千米，游泳時變成一直在算趟數。」游泳池

Would you like to listen to music while swimming? The waterproof sports earbuds and MP3 players on the market have made it possible for people to enjoy their favorite music underwater. And they all feature long playtime, improved capacity retention of batteries, and water and dust resistance. However, these earbuds and wireless headphones are more likely to fall out while swimming, giving users more hassle. Therefore, Jordan Huang, the CEO of Happy Island Tech, designed the headset-free music player exclusively for swimmers. The device can be placed on the back of the head or under swim cap without worrying about losing it while swimming.

Waterproof Headphones Featuring Bone Conduction Technology

"Earbuds are likely to fall out whenever the swimmer tilts the head left and right or does a push-off or a start," said Huang, who engaged in the research and development of IoT and the entrepreneurship of smart wearables out of his personal interest. He pointed out the pain point and need of many swimmers.

Given that traditional earbuds fall out easily or fail to seal out water from the ears, Jordan Huang incorporated the exclusive bone conduction technology into the design of Music Shell, a waterproof

標準池長度 50 公尺，泳者為了滿足幾千米的變成每趟游泳都要計算趟數，萬一中途在想事情，可能就忘了游了幾趟。

黃俊穎進一步指出，一般泳者想聽音樂，就會買一副防水耳機，再買一個運動裝置來記錄數據，音樂貝殼防水 MP3 耳機則把兩種功能「All in One」，同時滿足聽音樂與數據記錄的功能。游完泳後，可透過藍芽把數據同步到手機的 APP 上，並上傳儲存到雲端。

針對專業訓練者，音樂貝殼防水 MP3 耳機內建傳感器與快樂島公司研發的演算法，可辨識自由式、蛙式、蝶式、仰式等泳姿是否正確，還能換算划手次數、划頻、

▲ 第二代音樂貝殼強調聲學跟運動分析演算法，透過 AI 偵測泳者的動作，記錄下不同的泳姿，以及游了多少的時間與距離並加以計算、分析，把運動記錄的事交給音樂貝殼，目標達成了它會自動發出提醒。The second-generation Music Shell highlights acoustics and algorithms in sports analytics. The built-in AI detects the swimmer's movements, keeps track of different swimming postures, and analyzes the swimming time and distance recorded. Leave sports monitoring to Music Shell, and it will automatically notify the user once the goal has been achieved.

headset-free MP3 player. Once placed on the back of the head or under swim cap, the brand new Music Shell allows users to enjoy music underwater.

Featuring bone conduction technology, the waterproof Music Shell MP3 player transmits midrange and treble to the inner ear through vibration and transmits bass with water as the medium. Even without earbuds, hence, swimmers can still listen to music underwater. With water as the transmission medium, surround sound effects can even be created. In addition, "The optimal transmission distance is within one meter. It does not hurt the ears or disturb other swimmers," according to Huang.

Collecting Sports Data for Swimmers

The second-generation Music Shell is upgraded with a voice assistant notifying the recorded swimming time and distance to users. "For people who enjoy swimming in long distance, let's say two or three thousand meters at a time, swimming usually ends up counting laps," Huang explained. The length of a standard swimming pool is fifty meters. Swimmers have to keep counting laps to track how far they have swum, and it is easy to lose count.

Huang further pointed out that swimmers usually buy a pair of waterproof earbuds to listen to music and buy another sports device to record their sports data. The waterproof Music Shell MP3 player is an all-in-one device that plays music and records data at the same time. After a swim, users can synchronize the data with the app on the phone via Bluetooth and upload it to the Cloud.

The waterproof Music Shell MP3 player also targets professionally trained swimmers. With its built-in sensors and algorithms designed by Happy Island Tech, it can recognize the swimming postures of freestyle, breaststroke, butterfly, and backstroke and monitor other data including the stroke count, stroke rate, and stroke length. "For professionally trained swimmers, these parameters can help them measure the efficacy of their training," Huang added.

滑距等專業數據，「對比較專業或長期訓練的泳者來說，可以透過這些游泳參數，評估自己的訓練成效。」

社群分享互動帶來更多商機

國人熱愛運動風潮不減，運動智慧穿戴硬體技術更趨成熟，吸引越來越多新創公司投入「揮汗」運動產業，打造出運動科技產業生態系。黃俊穎認為，隨著自家產品使用者增多，未來可累積清楚的游泳目標客群。「我們把自己的產品定位為 IoT 產品，未來可利用 APP 來經營社群互動服務。」使用者可在社群上彼此分享運動數據與游泳新知，下載隨選音樂，快樂島公司也將攜手專業游泳教練設計個人化的游泳語音訓練課程。「使用者可透過語音教練按部就班完成訓練，並檢視該次訓練的成果，例如消耗卡路里數，自由式的速度是否進步等等。」推出客製化語音訓練服務，將是黃俊穎想推動的下一步。

由於快樂貝殼防水 MP3 耳機銷往中國、美國、澳洲、德國、日本等市場，因此相當重視手機 APP 所收集到的私人運動數據安全性。「我們對個人運動數據的隱私與安全性，採取歐洲最嚴格 GDPR 個資法的標準。」在 APP 內，除事先告知使用者數據的使用方式，也允許使用者可選擇是否上傳雲端，並提供一鍵刪除運動數據的機制，APP 也不能強制使用者留下真實姓名，因此提供了多元化的註冊方式，使用者可使用手機簡訊、Facebook 或微信等註冊及登錄方式。

隨著國人熱愛運動健身與自我防護要求，未來的運動類與週邊產業將會更加蓬勃，若能協助新創產業走過最艱辛的前幾年，以台灣創新公司的活力，必定能催生更多獨角獸。

對於台灣目前的數位產業環境，黃俊穎認為像自己公司這樣的 IoT 新創企業，普遍都面臨到資金上的挑戰。「台灣的創業環境其實

Social Media Interactions Boosting Business Opportunities

In Taiwan, as sports remains popular and sports wearable technology has become mature, more and more startups are investing in the sports industry, trying to build a sports technology ecosystem. Huang believed that as the product attracts more users, it is possible to identify the target market in the future. Huang explained, "We position our products as IoT products, and we will leverage apps for customer interaction management and customer services in the future." Users will be able to share their sports data and knowledge of swimming with each other and download the music they like. In addition, Happy Island Tech will work with professional swimming instructors and provide personalized training courses via audio recordings. Huang added, "Users can complete their training with the guidance of their coaches via audio recordings and examine the results of their training with data such as how many calories they have burned, or if they have swum faster freestyle." His next step is to offer customized pre-recorded training services.

The waterproof Music Shell MP3 player is sold in several countries, including China, the U.S., Australia, Germany, and Japan. Therefore, the security of personal sports data collected through the app is especially valued by Happy Island Tech. Huang explained, "We comply with the EU GDPR in regard to the privacy and security of personal sports data." When using the app, users are notified of the terms of service and they can decide if they would like to upload the data to the Cloud or not. They are also allowed to delete all sports data collected with one simple tap on the phone. Moreover, users can register and log in either with their real names or not, which means registration with mobile numbers, Facebook accounts, and WeChat accounts are allowed as well.

As people in Taiwan become more and more enthusiastic about sports, fitness, and personal health, the sports industry is expected to continue to grow in the future. With Taiwan's vibrant and dynamic startup ecosystem, if the

並不是那麼友善，雖然政府提供了導入孵化器或加速器等協助，但有時無法真的非常到位。」

黃俊穎以自己產品開發為例，大約前期研發到能夠商轉期間的營運模式調整，起碼就要熬三年以上，「如果沒有投入至少 3000 萬到 5000 萬的資金，是不可能成功的。」很多徒有抱負與技術的新創人才，往往不明就裡就跳下來創業，結果商業模式還沒有成功就已經陣亡。

他建議政府可針對每一個特定新創產業成立國家級的加速器或培訓中心，提供創業者必要的導師服務與啟動資金，並幫助整合上下游廠商與業界專家，等到廠商的商業模式成功後，政府再行退場。「國外已經有不少加速器採用這樣的模式，並且締造許多成功的案例。」

▲ 資金上的挑戰是 IoT 新創企業最常碰到的問題，黃俊穎執行長希望政府能提供創業者必要的導師及啟動資金。
Lack of funding is the most common challenge for IoT startups. Happy Island Tech CEO Jordan Huang suggests that the government provide necessary mentorship programs and funds for these entrepreneurs.

government can help startups make through the first few years, there will be more unicorn companies for sure.

In the current digital industry environment in Taiwan, Huang believed that lack of funding is a common challenge for his company and many other IoT startups. "The ecosystem in Taiwan is actually not quite startup-friendly. Even with startup incubators and accelerators provided by the government, sometimes the assistance has limited effects," Huang said.

According to Huang, it took him at least three years to go from preliminary research and development to commercialization. He indicated, "It is impossible to succeed without investing in at least thirty to fifty million dollars." Many ambitious and skilled startup talents start their companies without knowing the reality, and their business models end up failing.

Huang suggested that the government establish national startup accelerators and training centers specialized for each startup industry, provide necessary mentorship programs and funds for entrepreneurs, and help match manufacturers, businesses, and experts. The government will withdraw once the business model has been proven to be successful. "This type of incubators has been adopted in many countries and there have been many successful cases ever since," Huang said.

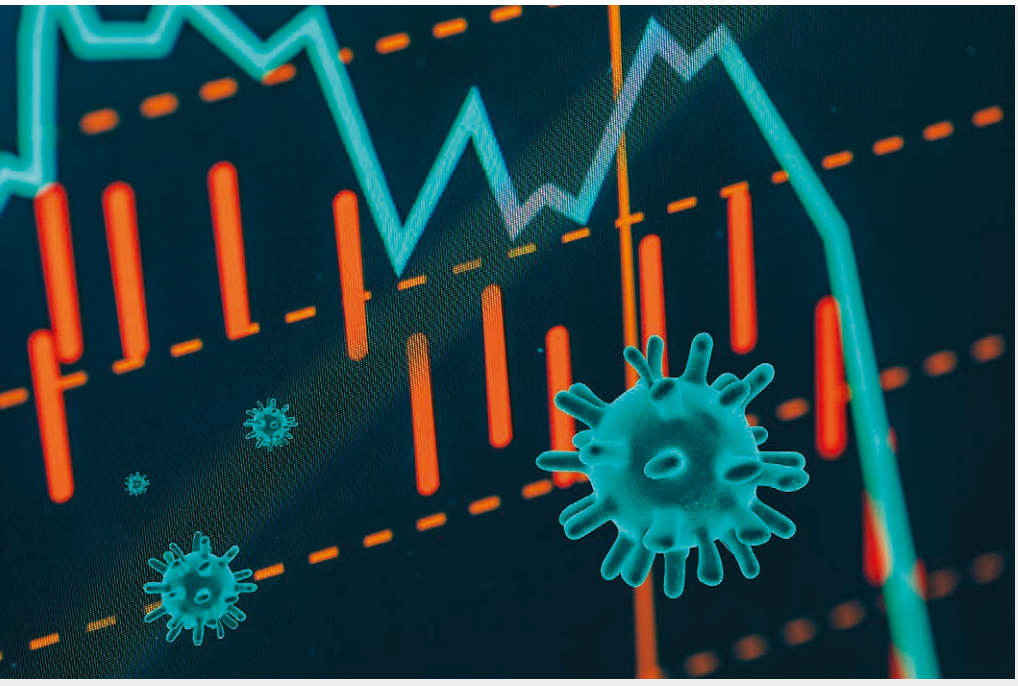
新冠肺炎肆虐 看科技如何抗疫不缺席

How Technology is Applied to Combat COVID-19

新冠肺炎（COVID-19）在全球肆虐，全面的衝擊堪比SARS、911恐攻加上金融海嘯的總和，是二次世界大戰以來，世界面臨最艱難挑戰，從各個層面思考如何對抗疫情帶來的衝擊，是大家唯一關心的事情，而其中從現有科技尋找抗疫手段，更是重中之重。

即刻研發療法 保護醫療人員

對抗疫情，首要當然是研發疫苗，根據BBC報導，由於DNA測序科技的發展，此次疫苗的研發在中國大陸公布病毒遺傳密碼後幾小時內，就展開了疫苗的研發，美國聖地亞哥的Inovio實驗室研發部門資深副主任博洛德里克（Kate



▲ 新冠肺炎（COVID-19）在全球肆虐，導致全世界的股市大跌、經濟下滑。The epidemic of COVID-19 around the globe leads to a worldwide stock plunge and a flagging economy.

Coronavirus disease 2019 (COVID-19) affects the whole world with a large outbreak, which results in a major blow even more severe than the overall influence of SARS, the 9/11 terror attacks, and the global financial crisis altogether. The unprecedented challenge is believed to be the worst one since World War II. The only concern of mankind is to mitigate the impacts of the outbreak by all means. In particular, seeking solutions against the disease through the existing technologies is of utmost importance.

Developing Treatments Immediately to Protect Medical Personnel

Developing a vaccine against the virus is undoubtedly the top

Broderick）就表示：「一經提供病毒遺傳密碼，我們前後約 3 小時就通過實驗室電腦軟體設計好了新疫苗。」如果人體臨床實驗成功，新疫苗可能在 2020 年底就能進入量產，所以為時尚早，但相比當年 SARS 幾乎是在疫情結束後才開始研發疫苗，生物科技的進步已讓速度翻了幾翻。

在疫苗問世之前，我們當然還需要尋找更多的治療方法，而靠人腦來不及，就需要倚靠人工智慧來協助，春節假期一結束，「PTT 創世神」杜奕瑾所率領的「台灣人工智慧實驗室」即刻上工，利用團隊已開發的「variant2literature 基因變異搜尋引擎」，有系統性的分析病毒株，並有效率的領先全球兩天找出在臨床上可運用的有效藥物，可不要小看這短短兩天，在全球疫情告急的非常時期，每一天可都攸關數百條生命的存亡。

除了釜底抽薪的疫苗研發，面對傳染力極強的病毒，醫護人員的防護也是生物科技研發的重點，除了口

▲ 在新疫苗出現之前，勤洗手、戴口罩仍是最好的預防措施。Frequent hand washing and wearing a mask are still some of the best prevention methods before the instruction of new vaccines.

priority. According to BBC News, benefiting from the advancement of DNA sequencing technology, the vaccine development was started immediately within a few hours right after China released the genetic code of coronavirus. "Once China had provided the DNA sequence of this virus, we were able to put it through our lab's computer technology and design a vaccine within three hours," said Kate Broderick, the senior vice-president of research and development at Inovio Pharmaceuticals Inc. If the results of the clinical trials on human participants are positive, the new vaccine is expected to go into mass production by the end of 2020. Although there is still a long way to go, the advancement in biotechnology has already accelerated the process by several times, compared to the development of SARS vaccines, which did not begin until the very end of the outbreak.

Of course, more efforts are needed to seek possible treatments before the vaccine is available, and artificial intelligence can be of great help. Right after the spring vacation, Ethan Tu, the founder of PTT Bulletin Board System, led the research team Taiwan AI Labs to start the efforts. By utilizing their "variant2literature Genetic Mutation Search Engine" to analyze the COVID-19 virus strains in a systematic way, the team made it to find clinically applicable medicines two days ahead of the global academia. Considering the severity of the outbreak, such an achievement is significant, as every single day can be a matter of life and death to hundreds.

In addition to the ultimate solution of developing vaccines, protection of medical personnel confronting the highly infectious virus is also the main focus in the biotechnological research. Apart from face masks and coveralls, it is necessary to figure out how to reduce direct contacts between medical workers and patients. Fever check, for example, is a difficult task because it puts front-

▲ 新冠肺炎（COVID-19）的出現，讓全球都努力研究疫苗的研發中。The outbreak of COVID-19 makes many countries strive to develop new vaccines.

罩、防護衣的保護外，更要積極地思考如何利用科技手段，減少醫護人員與病人的直接接觸，例如「量體溫」就是個頭痛任務，不僅有感染風險，還耗費大量工時與人力。台灣物聯網新創 iWEECARE 愛微科就推出智慧體溫貼片 Temp Pal 添寶，由於可以雲端大量監測多位患者體溫，不需要專人量測，因此獲得來自中國大陸、日本代理商洽詢合作。

運用科技遏制傳播 台灣受肯定

不過當下，疫苗或治療方法的研發還在進行式時，遏止病毒蔓延的最有效方法，還是盡快找出受感染的個人，並在他們感染別人之前，將他們隔離進行治療，以遏止病毒傳播。

日前，以色列總理納坦雅胡日前公開讚揚台灣「科技防疫」技術，他說：「我們正在與一個看不見的敵人交戰。」因此以色列考慮用電子追蹤系統掌握隔離者與其接觸者，這個數位科技「已在台灣進行測試，且顯然取得巨大成功。」

而這個「掌握接觸者的相關技術機制與科技」，是由中華電信主導、

line medical workers at risk of being infected and takes a lot of time and manpower. As a result, iWEECARE, a Taiwan-based IoT startup, launched a smart thermometer patch called Temp Pal, which is capable of monitoring the body temperature of multiple patients at once through cloud service without the need of human care providers. So far, the product has attracted the attention of many agencies from China and Japan seeking cooperation.

Taiwan Recognized for Using Technologies to Contain Virus Spread

When vaccines or treatments are still under development, the most effective way to contain the spread of the virus is to search out every infected individual as soon as possible and isolate these patients for further treatments to avoid virus spread.

Several days ago, Benjamin Netanyahu, Prime Minister of Israel, praised Taiwan publicly for its epidemic prevention technology. "We are at war with an invisible enemy," he indicated. As a result, Israel is now considering electronic tracking systems as a means to manage patients in quarantine and their contacts, since this technology "has been tested in Taiwan, apparently with great success."

The relevant mechanisms and technologies behind this contact tracking system was developed by the National Team of Epidemic Prevention Technology. Aside from the leader of the team, Chunghwa Telecom, HTC Corporation is also a member of the national force. Since February 1, a comprehensive dedicated monitoring system has been on service in Taiwan to keep an eye on people in home quarantine due to COVID-19 and record their locations. Over 11,000 mobile phones are under monitoring, and relevant data are stored on a platform only accessible by the Taiwan Centers for Disease Control (Taiwan CDC) and authorized personnel. The information displayed in forms of city heat maps and real-time location maps will not be uploaded nor provided to any third party.

Chengwei Li, director of Chunghwa Telecom's Big Data Department, indicated that the electronic epidemic prevention platform incorporates mobile phone location tracking and an electronic fence system. The platform displays the

包含宏達電的「科技防疫國家隊」來執行。打從 2 月 1 日開始，台灣就出現一個特殊的偵測系統，掌握著新冠肺炎居家隔離者、居家檢疫者的所在位置。這些被「掌握」的手機號碼雖然已超過 1 萬 1 千多個，但僅台灣疾管署及其授權對象才看得到的平台上，以縣市熱力圖、即時定位圖呈現，不會主動上傳，也不會主動提供給其他人。

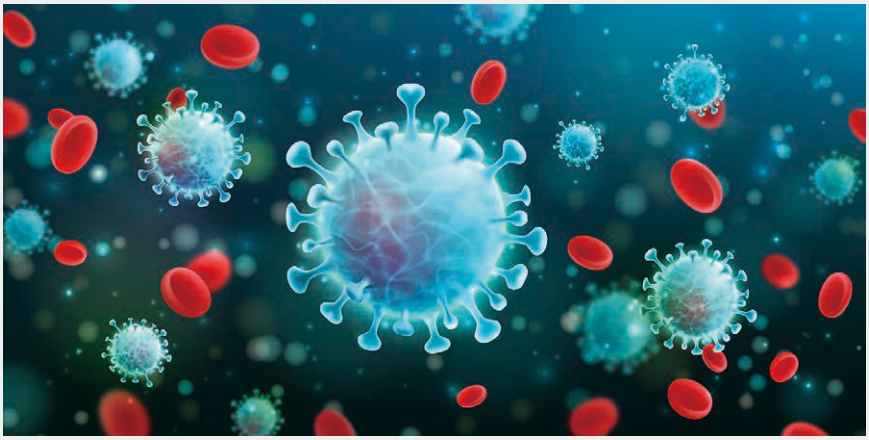
中華電信大數據處總監李誠偉表示，這個「電子防疫服務平台」，同時涵蓋手機定位追蹤及電子圍籬機制。可顯示被監控者目前所在位置、近 24 小時足跡，好讓疾管署和警方即時尋人；倘若某人確診，也可調出過去歷史所有足跡，擴大找尋可能接觸者。

◀ 透過手機偵測系統，可以有效掌握新冠肺炎居家隔離者、居家檢疫者的所在位置。Through the mobile phone tracking system, locations of people in home isolation and home quarantine can be managed effectively.

病毒推動科技應用的進步

新冠病毒的爆發雖是不幸，但就如賈德・戴蒙的《槍砲、病菌與鋼鐵》一書中所說，人類文明的推動，有時往往與病毒流行有說不清的連結，此次因為新冠肺炎流行，除了在抗疫相關科技有所進展外，因為鼓勵大家宅在家辦公、上學，推動影音匯流技術的應用擴大，也是不爭的事實，說不定當疫情陰霾過去，人類科技將有機會看見更多的可能。

current position of people being monitored and their movements in the previous 24 hours, enabling the CDC and the police to track them in real time. If someone tests positive for coronavirus, the system can provide detailed logs of his/her previous movements to facilitate further search of possible contacts.



▲ 新冠肺炎（COVID-19）雖是全球的公敵，然而或許在這看不見的敵人的刺激下，推動了未來科技應用的進步。Although COVID-19 is the common enemy of mankind, such an invisible opponent may have stimulated the growth of future technology applications.

Advancement of Technological Applications Expedited by the Virus

While the outbreak of COVID-19 is a great misfortune, the development of human civilizations usually has much to do with the widespread occurrence of viruses, as Jared Diamond suggested in *Guns, Germs and Steel*. Apart from the progress in technologies related to disease prevention, it is evident that the COVID-19 pandemic has also expanded the application of audio-visual convergence as people are encouraged to work from or learn at home. Perhaps after the outbreak ends, more possibilities would be opened up for human beings.

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