Double Championship at Electrical and Computer Engineering Week: Integrating NVIDIA Technology in Unmanned Stores

The annual Electrical and Computer Engineering Week's biggest winner, "Logistics Workstation Based on Digital Twins," was developed by fourth-year students Bo-Yun Yu, Mu-Hua Huang, and Teron Tristan Benjamin. The project won dual championships in the "Innovation and Creativity Competition" and the "Unmanned Delivery Creativity Competition." The team shared their achievements with alumni, faculty, and students at the 4th "Electronics and Electrical Engineering Alumni Forum" of the year. The forum was held on December 14 at 3:00 PM in the D508 Alumni Hall of the Taipei Campus, with 30 alumni and students in attendance.

The "Logistics Workstation Based on Digital Twins" project, guided by Professor Ching-Chang Wong, director of the Automation and Robotics Center, integrated digital twin technology with artificial intelligence. The system consisted of 3 main components: a picking system, a packing system, and a shipping system, utilizing robotic arms to achieve full automation in a logistics factory. During the system verification stage, dual validation—virtual and real—was applied. The virtual component used the NVIDIA Isaac Sim platform to create a simulated environment where models and real-world objects could be represented virtually. Modular virtual datasets were built and compared with real-world datasets to evaluate the model's performance, allowing developers to verify system efficiency and reduce labor costs.

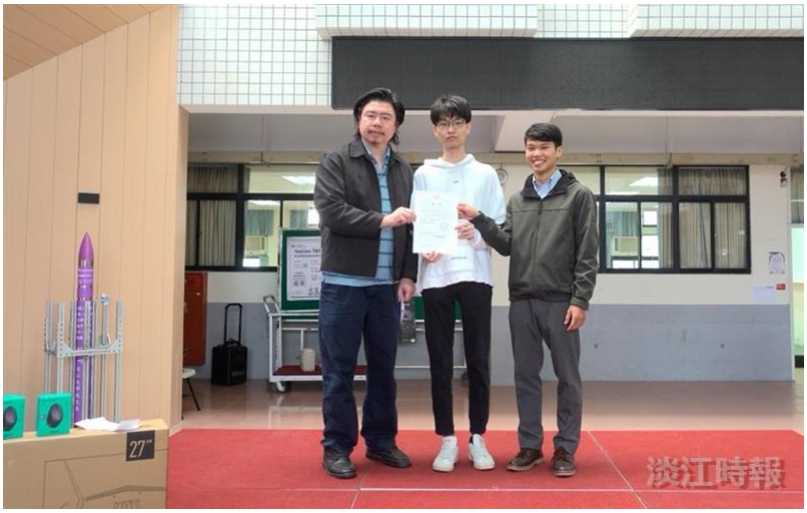
Bo-Yun Yu noted that the most challenging technical aspect was combining the virtual and real worlds, such as applying virtual packing models to real-life scenarios. The team successfully solved this problem by collaborating and using visual methods to achieve coordinate transformations. He expressed gratitude for the support of their advisor and access to equipment and resources, which enabled them to complete the project and continue improving.

The top 3 teams from both competitions also shared their projects during

the forum. Alumni enthusiastically engaged with the students, asking questions and offering feedback. Senior alumni not only encouraged and affirmed the students but also generously shared presentation techniques, fostering deeper interaction. The second and third-place projects in the 2 competitions were as follows: Innovation and Creativity Competition: "A Low-Power Sensitivity Dual-Mode Divider Phase-Locked Loop Architecture for UHF RFID Applications," "A Decision Feedback Equalizer for Displays at 3Gb/s Data Rates". Unmanned Delivery Creativity Competition: "Design and Optimization of an FPGA License Plate Recognition System," "Camera-Based Distance Measurement for Humanoid Robot Basketball Competition Strategies."

The forum was held following the 2nd Board of Directors and Supervisors Meeting (9th Session) of the Electronics and Electrical Engineering Alumni Association. The meeting, chaired by the Department Alumni Association President Shih-Jen Lin, also included the second general assembly. During the assembly, members reviewed the annual report, discussed plans for the upcoming year, and deliberated on ways to promote the development of the department and alumni association.

2025/01/20



The team behind the "Logistics Workstation Based on Digital Twins," winner of both major competitions during Electrical and Computer Engineering Week, received their award from Department Chair Peter Liu.

The double championship-winning project, "Logistics Workstation Based on Digital Twins," was presented during the Electronics and Electrical Engineering Alumni Forum.

Department Chair Peter Liu (front row, fifth from left), Alumni Association President Shih-Jen Lin (front row, sixth from left), and attending alumni and students pose for a group photo.