Four GIST Mechanical Engineering Students Win Grand Prize in the First Army-Navy-Air Unmanned Vehicle Challenge

- Four students from the School of Mechanical Engineering, including master's student JinHyuck Park, master's graduates Junki Shim and Gwonyeol Lee, and undergraduate student Nicholas Chaehoon Song presented 'anti-drone technology' such as 'tracking control' and 'illegal drone detection and identification' using high-performance PTZ cameras
- Conducted drone autonomous operation research for more than two years at the 'Data-Driven Simulation and Design Optimization Lab (advisor: Seongim Choi)'... Received 10 million won in prize money for "Outstanding challenging and novel approach"

▲ The ‘GISTracker’ team of the Data-Driven Simulation and Design Optimization Lab (advisor: Professor Seongim Choi) of the School of Mechanical Engineering at GIST is taking a commemorative photo after winning the grand prize in the ‘1st Army, Navy, and Air Force Unmanned Vehicle Challenge’ designated contest I (‘Detection-Identification-Tracking’ mission). (From left) master's student JinHyuck Park, master's graduate Junki Shim, and undergraduate student Nicholas Chaehoon Song

The Gwangju Institute of Science and Technology (GIST, President Kichul Lim) announced that the ‘GISTracker’ team of the Data-Driven Simulation and Design Optimization Lab (advisor: Professor Seongim Choi) of the School of Mechanical Engineering won the grand prize (National Research Foundation of Korea Chairman’s Award) in the designated competition I category (‘Detection-Identification-Tracking’ mission) of the ‘1st Army-Navy-Air Unmanned Vehicle Challenge’.

In response to North Korea's drone infiltration, which became a national issue in late 2022, the 'Land, Sea, and Air Unmanned Vehicle Challenge' hosted by the Ministry of Science and ICT and the National Research Foundation of Korea presented 'detection-identification-tracking' and 'neutralization' of illegal drones as its main missions. Participating teams must perform missions through autonomous flight without pilot intervention using their own developed drone systems.

In the designated contest category I, the task of ‘continuous detection and identification of illegal drones’ was given, and the competition was divided into student and corporate categories. The GISTracker team that participated in the student category advanced to the final round through the first preliminary round (proposal evaluation) and the second preliminary round (presentation evaluation) and competed.

GISTracker team members master's student JinHyuck Park, master's graduates Junki Shim and Gwonyeol Lee, and undergraduate student Nicholas Chaehoon Song have all been conducting research on autonomous drone operation in Professor Seongim Choi's lab for more than two years.

The ‘GISTracker’ team developed tracking control technology based on MPC (Model Predictive Control) using high-performance PTZ cameras* and illegal drone detection and identification technology based on CNN (Convolution Neural Network). They made it so that the detection-identification-tracking process works organically when a bird passes by in the sky or a sudden situation occurs outside. In particular, they received high praise for implementing anti-drone technology*.

* PTZ camera: Abbreviation for pan tilt zoom camera, which refers to a camera that can zoom in and out by tilting the camera left, right, up and down.

* anti-drone technology: A general term for technology to respond to illegal drones, which generally consists of the stages of detection-identification-neutralization.

An official from the competition commented on the GISTracker team’s achievement, saying, “Detecting illegal drones and identifying their models using cameras is a very challenging and novel approach.”

JinHyuck Park Park, representing the GISTracker team, said, "The drone-related knowledge and experience I gained in the lab under the guidance of Professor Seongim Choi were a great help in preparing for this competition. I plan to research related topics in more depth and publish a paper in the future."

▲ The ‘GISTracker’ team of the Data-Driven Simulation and Design Optimization Lab (advisor: Professor Seongim Choi) of the School of Mechanical Engineering at GIST is receiving the grand prize in the designated contest I (‘Detection-Identification-Tracking’ mission) of the ‘1st Army-Navy-Air Unmanned Vehicle Challenge’.

Meanwhile, the ‘1st Army, Navy, and Air Force Unmanned Vehicle Challenge’ hosted by the Korea Research Association of Unmanned Vehicles (KRAUV) was held from June of last year to May of this year.

The awards ceremony was held in Taean on Friday, May 17, 2024, and the GISTracker team received a prize of 10 million won along with a plaque.