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RESEARCH INTERESTS

Automotive Security	Connected vehicle security, Threat Analysis and Risk Assessment (TARA), in-vehicle security (CAN IDS, gateway, Ethernet firewalls), Plug & Charge security (ISO 15118), automotive software update over-the-air (OTA), blockchain-based automotive security, regulation and compliance (UN R155/R156, ISO/SAE 21434, SAE J3061, ISO 24089)
Physical AI & Mobility	Capability-aware safe meta-decision for physical AI robotics (Try-Ask-Refuse), cross-domain perception, LLM/VLM-based multimodal decision systems, multi-sensor fusion and adaptive point cloud processing, trajectory planning for collision avoidance
Cybersecurity Policy & Technology	Secure software development life cycle, crisis management and incident response, public cloud security, web and mobile security inspection, ISO/IEC 27001

EDUCATION

2013 – 2021 **Ph.D. in Cybersecurity**
School of Cybersecurity, Korea University
Thesis: *Data-driven Anomaly Detection using Hierarchical Multi-labeled Classification for Vehicular Communications*. Advisor: Prof. Jin-Young Choi

2006 – 2008 **M.S. in Computer Science and Engineering**
College of Informatics, Korea University
Advisor: Prof. Jin-Young Choi

1999 – 2006 **B.S. in Computer Science and Engineering**
Division of Computer Science and Engineering, Chung-Ang University

PROFESSIONAL EXPERIENCE

Sep. 2021 – Present **Assistant Professor**
Division of Computer Engineering, Hansung University
– Physical AI, Cybersecurity, Intelligent Mobility, Web Engineering

Jan. 2024 – Feb. 2026 **Director**
Center for Industry-Academia Learning Supports, Hansung University
– University-industry collaboration and education programs

Dec. 2014 – Aug. 2021 **Senior Manager**
Hyundai Information Security Center, Hyundai Motor Company
- Cybersecurity crisis management, risk assessment and incident response
- Automotive security for connectivity services, CAN IDS and SoC, Plug & Charge infrastructures
- Cybersecurity governance for vehicle-IT environments and security infrastructures

May 2011 – Nov. 2014 **Manager**
Advanced Institute of Technology, Korea Telecom Corp.
- Data analytic models in social media platforms for adaptive IPTV service
- Intelligent knowledge service for social media and web-based IPTV platform

Feb. 2008 – Apr. 2011 **Research Engineer**
Mobile Communications Laboratory, LG Electronics Inc.
- Mobile connectivity software
- Media Transfer Protocol, OMA SyncML DS, Rich Communication Suite

RESEARCH PROJECTS

Sep. 2026 – Aug. 2031 **Capability-Aware Safe Meta-Decision in Physical AI-Driven Robotics: A Try-Ask-Refuse Framework**
National Research Foundation of Korea (NRF), funded by MSIT
- 2026 Basic Research Grant (Core Research), KRW 250 million over 5 years
- Physical AI robots assess their own capability and choose to try, ask a human, or refuse, so that unsafe or infeasible commands are declined rather than attempted

Aug. 2025 – Aug. 2026 **Cross-National AI Mobility: Joint Korea–Japan Research on Cross-Domain Perception and LLM/VLM-Based Multimodal Decision Systems**
National Research Foundation of Korea (NRF)
- Cross-domain perception and LLM/VLM-based multimodal decision-making for AI-driven mobility

TEACHING

Sep. 2021 – Present **Web Engineering & Security Courses**
Division of Computer Engineering, Hansung University
- Information Security: Security Principles and Practices
- Web Framework 1: Web Front-end in Modern JavaScript and React.js
- Web Framework 2: Back-end in Modern JavaScript, Node.js and Express.js
- Web Programming: HTML5 and Modern JavaScript
- Open Source Software: Open Source Licenses

PROFESSIONAL ACTIVITIES

Executive Committee	The Korean Institute of Communications and Information Sciences (KICS), Korea Institute of Information Security and Cryptology (KIISC), The Korean Association of Mobility Studies (KAMS)
Editorial Board	International Journal of Automotive Technology (IJAT), Journal of the Korea Institute of Information Security and Cryptology (JKIISC), Transactions of the Korean Society of Automotive Engineers (TKSAE)
Reviewer	IEEE Transactions on Vehicular Technology (TVT), IEEE Transactions on Computers (TC), IEEE Access, Vehicles, Sensors, Informatics, Trans. KSAE, Journal of KICS (JKICS), KIPS Transactions on Computer and Communication Systems (KTCCS), Journal of Computing Science and Engineering (JCSE)
Program Committee	Co-Chair, CISC-S'26. Member: ICISC, IMIS 2025/2026, BWCCA, 3PGCIC, CISC-W'24/S'25/W'25/W'26
Organizing Committee	ICUFN 2023–2026, IEEE ICTC 2025/2026, IEEE BigComp 2025, ICOIN 2025–2027, JCCI 2024–2027, KICS Conferences (2024 Summer, 2025 Winter/Summer/Fall, 2026 Winter, 2027 Winter), KSAE Spring Conference 2024
Memberships	Academic Member, Auto-ISAC Committee; Member, IEEE and IEEE Vehicular Technology Society (VTS); Life Member, KIISC, KICS, KSAE, KAMS, KIPS
Advisory Group	Korea Health Information Service (KHIS), Korea Labor and Employment Service (KLES), Audit and Inspection Research Institute (BAI), Korea Expressway Corporation (KEC), Industrial Bank of Korea (IBK), International Constructors Association of Korea (ICAK), ez Caretech, CIoT, Koscom Corporation, Korea Correctional Service (Ministry of Justice)
R&D Planning Committee	Research Project Planning Member (Mobility Division), Daegu-Gyeongbuk Region-led R&D Project Group, 2026 AI Connected Car Technology Planning Committee (Mobility Cybersecurity Division), 2025–2026
Tutorial	*Future Security Paradigms for SDVs: From Cybersecurity to Trust*, JCCI 2026
Invited Talks	*Secure Smart Software-defined Vehicles: Research Trends and Challenges* — Keynote at BWCCA/3PGCIC 2023; Special lectures in Intelligent Mobility at Korea University and Dankook University (2024); WISC 2023; KIISE SWCC 2023; KICS Winter Conference 2023; SCH Mobility Workshop 2023; WDSC 2024 (@KCC); Automobile and Unmanned Vehicle Security Research Group 2024 (@KIISC); Future Communication Technology Workshop 2024 (@KICS and KSAE)

PUBLICATIONS (SINCE 2020)

ASTRA: Adaptive spatio-temporal representation for action recognition via importance-guided motion learning, *IEEE Journal of Selected Areas in Sensors*, Early Access, 2026.

Noise-adaptive correction for robust graph neural networks in trusted graph computing, *Discover Computing*, vol. 29, no. 1, 327, 2026.

Adaptive point cloud downsampling based on 3-D ROI detection for improved perceptual quality, *IEEE Access*, vol. 14, pp. 68039–68053, 2026.

FedAWT: Adaptive federated learning via dynamic epoch adjustment for heterogeneous clients in ad-hoc networks, *Internet of Things*, vol. 34, 101771, pp. 1–14, 2025.

Data division transmission method with performance analysis in Wi-Fi 7 multi-link operation, *IEICE Transactions on Communications*, vol. E108-B, no. 9, pp. 1052–1065, 2025.

Bio-2FA-IoD: A biometric-enhanced two-factor authentication protocol for secure Internet of Drones operations, *Mathematics*, vol. 13, no. 13, pp. 1–29, 2025.

Energy optimization and age of information enhancement in multi-UAV networks using deep reinforcement learning, *Electronics Letters*, vol. 60, no. 20, pp. 1–4, 2024.

PIER: Cyber-resilient risk assessment model for connected and autonomous vehicles, *Wireless Networks*, vol. 30, pp. 4591–4605, 2024.

Dynamic transmission and delay optimization random access for reduced power consumption, *IEEE Access*, vol. 12, pp. 55033–55050, 2024.

Improvement of the defense planning and management system to implement ROK's national cybersecurity strategy, *The Korean Journal of Defense Analysis*, vol. 35, no. 3, pp. 337–360, 2023.

Fairness-based multi-AP coordination using federated learning in Wi-Fi 7, *Sensors*, vol. 22, no. 24, 9774, 2022.

Combined oversampling and undersampling method based on slow-start algorithm for imbalanced network traffic, *Computing*, vol. 103, pp. 401–424, 2021.

Performance comparison of multi-class SVM with oversampling methods for imbalanced data classification, *Proc. BWCCA, Lecture Notes in Networks and Systems (LNNS)*, vol. 159, pp. 108–119, 2020.

Hierarchical anomaly detection model for in-vehicle networks using machine learning algorithms, *Sensors*, vol. 20, no. 14, 3934, 2020.

Malware detection in self-driving vehicles using machine learning algorithms, *Journal of Advanced Transportation*, vol. 2020, 3035741, 2020.