YeongHyeon Park

Postdoctoral Fellow | MD Anderson Cancer Center | young200405@gmail.com
Personal Page, | Google Scholar, | GitHub, | LinkedIn

Aims

My research focuses on robust anomaly detection and efficient representation learning, leveraging advances in pre-trained attention mechanisms, self-supervised learning, and lightweight neural networks. Building on extensive real-world experience with sensor, vision, audio, and hyperspectral systems at SK Planet, I aim to expand toward scalable multi-modal sensing and foundation-model–driven applications in the physical world. I also explore generative and pre-trained models—from compact architectures to large-scale systems—to improve defect detection, reduce false positives, and strengthen reliability in industrial and medical imaging.

Education

Sungkyunkwan University Feb. 2022 - Feb. 2025
Ph.D. in Electrical and Computer Engineering (GPA: 4.17/4.5) *Republic of Korea*

- **Dissertation:** Effective Anomaly Detection Towards Edge Computing by Leveraging Pre-trained Attention Mechanisms
- **Advisor:** Prof. Juneho Yi

Hankuk University of Foreign Studies Mar. 2018 - Feb. 2020
M.S. in Computer and Electronic Systems Engineering (GPA: 4.43/4.5) *Republic of Korea*

- **Thesis:** Performance Enhancement Method for Electrocardiogram Analysis
- **Advisor:** Prof. Il Dong Yun

Hankuk University of Foreign Studies Feb. 2012 - Feb. 2018
B.S. in Digital Information Engineering (GPA: 4.21/4.5) *Republic of Korea*

- **Thesis:** Implementation of a Real-Time Blink Recognition System using CNN
- **Advisor:** Prof. Il Dong Yun
- **Military Service:** Republic of Korea Army, Sergeant, Honorable Discharge (Aug.2013 - May.2015)

Experience

The University of Texas MD Anderson Cancer Center Aug. 2025 – present
Postdoctoral Fellow *Houston, TX, U.S.*

- Research and development of brachytherapy treatment planning algorithms
  * Implemented in-house brachytherapy treatment planning algorithms: inverse planning simulated annealing (IPSA), hybrid inverse planning optimization (HIPO), and multi-criteria optimization (MCO)
  * Analysis and comparison of existing inverse planning methods
- Advising capstone project of Texas A&M University to develop applicator digitization algorithm
  * Leveraging an unsupervised anomaly detection approach to detect applicator regions

SK Planet Co., Ltd. Sep. 2019 - Apr. 2025
Research Engineer *Republic of Korea*

- Led real-world multi-modal AI projects spanning vision, sensor, audio, and hyperspectral data, focusing on anomaly detection, calibration, and representation learning under practical constraints
- Expanded expertise from anomaly detection research toward telephony value-added services (VAS) using generative AI, including vision-language models
- Recognized as **"Key Talent"** for 3 consecutive years (2021, 2022, and 2023)
- **Plaster** (Planet+Master): In-house expert volunteering for lectures and group study (2021-2024)
- Developed wafer imaging system using line-scan cameras (w/ SK Hynix)
  * Wafer image scanning during transport from EFEM to chamber by a robotic arm
  * Reconstruction of distorted wafer image by estimating the robot arm's trajectory
  * Classifying wafer types for metadata mapping

- Implementation of aging-clock prediction model (w/ Bertis)
  * Develop an aging clock prediction model using the ComputAgeBench dataset
  * Achieved a correlation coefficient of 0.964 between chronological and predicted age
- Researched anomaly detection techniques to develop smart factory systems
  * Film defect classification system (w/ SKC)
  * Anomaly detection and prediction in die casting process (w/ KODACO)
  * Hyperspectral imaging-based serum anomaly detection (w/ SK Discovery)
- Spearheaded the development of audio-based road anomaly detection system
  * Accelerating training and inference speed by developing compact neural network structures
  * Designing and collecting tire friction sounds under various road conditions (w/ Hankook Tire)
  * Promotional videos: [Short version], [Full version]
- Anomaly detection in low-cost particulate matter sensors

Sungkyunkwan University Oct. 2021 - Jan. 2025
Research Assistant *Republic of Korea*
- Initiated research before official Ph.D. enrollment (Oct.2021 - Jan.2022)
- Developed an anomaly detection framework using pre-trained attention mechanisms
- Proposed a self-supervised learning strategy using deterministic masking
- Studied solar panel anomaly detection for efficient edge computing

Hankuk University of Foreign Studies Sep. 2017 - Aug. 2019
Research Assistant *Republic of Korea*
- Participated in research before official M.S. enrollment (Sep.2017 - Feb.2018)
- Researched biosignal analysis, medical image processing, and anomaly detection
- Developed an ECG-based cardiac disease diagnosis model (w/ Seoul National University Bundang Hospital)
- Studied time-series anomaly detection for rapid model training
- Conducted tissue segmentation on neuroimages for medical applications

StoryAnt Inc., Korea Jan. 2017 - Feb. 2017
Research Intern *Republic of Korea*
- Developed an intelligent archive system for historical document classification

Awards

Key Talent Award Nov. 2021, Nov. 2022, and Nov. 2023
SK Planet Co., Ltd. *Republic of Korea*
- Recognized as an exceptional team member in annual evaluations

Excellence Award in Manufacturing Data Analysis Competition Nov. 2023
Korea AI Manufacturing Platform (KAMP) *Republic of Korea*
- 3rd K-AI Manufacturing Data Analysis Competition (Finalist / Excellence Award) [News 1], [News 2]

Best Conference Paper Award Dec. 2021
IEEE International Conference on Architecture, Construction, Environment and Hydraulics *Republic of Korea*
- Non-Compression Auto-Encoder for Detecting Road Surface Abnormality via Vehicle Driving Noise [Certificate]

Minister's Commendation, Ministry of Science and ICT, IoT Awards 2021 Oct. 2021
Ministry of Science and ICT *Republic of Korea*
- SK Planet Receives the Minister of Science and ICT Award at the IoT Awards 2021 [News]

ITS Innovation Technology granted by Ministry of Land, Infrastructure and Transport Apr. 2021
Ministry of Land, Infrastructure and Transport *Republic of Korea*
- Hankook Tire and SK Planet's jointly developed solution was selected for the Ministry of Land, Infrastructure and Transport's "ITS Innovation Technology" contest. [News]

Excellence Undergraduate Thesis Award Nov. 2017

Department of Digital Information Engineering, Hankuk University of Foreign Studies *Republic of Korea*

- Implementation of a Real-Time Blink Recognition System using CNN [Certificate]

Academic Excellence Scholarship 2013 – 2017

Department of Digital Information Engineering, Hankuk University of Foreign Studies *Republic of Korea*

- Full-tuition scholarship (Spring. 2016, Fall. 2016, and Spring. 2017)
- Half-tuition scholarship (Spring. 2013)

Publications

Journals

[J8] YeongHyeon Park, Sungho Kang, Myung Jin Kim, Yeonho Lee, Hyeong Seok Kim, and Juneho Yi "Visual Defect Obfuscation Based Self-Supervised Anomaly Detection.", *Scientific Reports*, *Aug.2024*

[J7] YeongHyeon Park, Myung Jin Kim, Uju Gim, and Juneho Yi "Boost-Up Efficiency of Defective Solar Panel Detection with Pre-Trained Attention Recycling", *IEEE Transactions on Industry Applications*, *Mar.2023*

[J6] YeongHyeon Park and JongHee Jung "Efficient Non-Compression Auto-Encoder for Driving Noise-Based Road Surface Anomaly Detection", *IEEJ Transactions on Electrical and Electronic Engineering*, *Jul.2022*

[J5] YeongHyeon Park, Won Seok Park, and Yeong Beom Kim "Anomaly detection in particulate matter sensor using hypothesis pruning generative adversarial network", *ETRI Journal*, *Dec.2020*

[J4] YeongHyeon Park, Il Dong Yun, and Si-Hyuck Kang, "The CNN-based Coronary Occlusion Site Localization with Effective Preprocessing Method", *IEEJ Transactions on Electrical and Electronic Engineering*, *Vol.15*, *no.10*, *pp.1549-1551*, *Aug.2020*

[J3] YeongHyeon Park, Il Dong Yun, and Si-Hyuck Kang, "Preprocessing Method for Performance Enhancement in CNN-based STEMI Detection from 12-lead ECG", *IEEE Access*, *Vol.7*, *pp.99964-99977*, *Jul.2019*

[J2] YeongHyeon Park and Il Dong Yun, "Arrhythmia detection in electrocardiogram based on recurrent neural network encoder–decoder with Lyapunov exponent", *IEEJ Transactions on Electrical and Electronic Engineering*, *Vol.14*, *no.8*, *pp. 1273-1274*, *May.2019*

[J1] YeongHyeon Park and Il Dong Yun, "Fast Adaptive RNN Encoder-Decoder for Anomaly Detection in SMD Assembly Machine", *Sensors*, *Vol.18*, *no.10*, *pp.3573*, *Oct.2018*

Conferences

[C13] YeongHyeon Park, Sungho Kang, Myung Jin Kim, Hyeong Seok Kim, and Juneho Yi "Feature Attenuation of Defective Representation Can Resolve Incomplete Masking on Anomaly Detection.", *IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshop (CVPR-W) 2025*

[C12] YeongHyeon Park, Myung Jin Kim, Hyeong Seok Kim "Contrastive Language Prompting to Ease False Positives in Medical Anomaly Detection.", *IEEE International Symposium on Biomedical Imaging (ISBI) 2025*

[C11] **YeongHyeon Park***, Sungho Kang*, Myung Jin Kim, Yeonho Lee, and Juneho Yi "Exploiting Connection-Switching U-Net for Enhancing Surface Anomaly Detection", *IEEE International Conference on Electrical, Control and Instrumentation engineering (ICECIE) 2024* (* Equal contribution)

[C10] YeongHyeon Park, Sungho Kang, Myung Jin Kim, Hyeonho Jeong, Hyunkyu Park, Hyeong Seok Kim, and Juneho Yi "Neural Network Training Strategy to Enhance Anomaly Detection Performance: A Perspective on Reconstruction Loss Amplification.", *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2024*

[C9] Hanbyul Lee*, **YeongHyeon Park***, and Juneho Yi "Enhancing Defective Solar Panel Detection with Attention-guided Statistical Features using Pre-trained Neural Networks", *IEEE International Conference on Big Data and Smart Computing (BigComp) 2024* (* Equal contribution)

[C8] YeongHyeon Park, Uju Gim, and Myung Jin Kim "Edge Storage Management Recipe with Zero-Shot Data Compression for Road Anomaly Detection", *IEEE International Conference on Information and Communication Technology Convergence (ICTC) 2023*

[C7] Sungho Kang, Hyunkyu Park, YeongHyeon Park, Yeonho Lee, Hanbyul Lee, Seho Bae, and Juneho Yi "Exploiting Monocular Depth Estimation for Style Harmonization in Landscape Painting.", *IEEE International Conference on Knowledge Innovation and Invention (ICKII) 2023*

[C6] Hyunkyu Park, Sungho Kang, YeongHyeon Park, Yeonho Lee, Hanbyul Lee, Seho Bae, and Juneho Yi "Edge Storage Management Recipe with Zero-Shot Data Compression for Road Anomaly Detection", *IEEE International Conference on Knowledge Innovation and Invention (ICKII) 2023*

[C5] YeongHyeon Park, Myung Jin Kim, Won Seok Park, and Juneho Yi "Recycling for Recycling: RoI Cropping by Recycling a Pre-trained Attention Mechanism for Accurate Classification of Recyclables", *IEEE International Conference on Smart Information Systems and Technologies (SIST) 2023*

[C4] YeongHyeon Park, Myung Jin Kim, and Won Seok Park "Frequency of Interest-based Noise Attenuation Method to Improve Anomaly Detection Performance", *IEEE International Conference on Big Data and Smart Computing (BigComp) 2023*

[C3] YeongHyeon Park, Myung Jin Kim, and Uju Gim "Attention! Is Recycling Artificial Neural Network Effective for Maintaining Renewable Energy Efficiency?", *IEEE Texas Power and Energy Conference (TPEC) 2022*

[C2] YeongHyeon Park and JongHee Jung "Non-Compression Auto-Encoder for Detecting Road Surface Abnormality via Vehicle Driving Noise", *IEEE International Conference on Architecture, Construction, Environment and Hydraulics (ICACEH) 2021*

[C1] YeongHyeon Park and Myung Jin Kim "Design of Cost-Effective Auto-Encoder for Electric Motor Anomaly Detection in Resource Constrained Edge Device", *IEEE Eurasia Conference on IOT, Communication and Engineering (ECICE) 2021*

Patents

US Patents

[US-P2] US12442796B2, Apparatus and Method for Analyzing Road Surface Condition based on Vehicle Noise, Oct.2025.

[US-P1] US12300101B2, Apparatus and System for Detecting Road Surface Condition and Method for Detecting Road Surface Condition by Using Same, May.2025.

Korea Patents

[KR-P7] KR102843506B1, Apparatus for detecting abnormality of Particulate Matter sensor based on hypothetical pruning Generative Adversarial Network (HP-GAN) and method therefor, Aug.2025.

[KR-P6] KR102737477B1, Management Method of Foreign Matter for Liquid Products based on a Graph and an Device Supporting the Same, Nov.2024.

[KR-P5] KR102737476B1, Management Method of Foreign Matter for Liquid Products and an Device Supporting the Same, Nov.2024.

[KR-P4] KR102609459B1, Road condition detection device and system, road condition detection method using the same, Dec.2021.

[KR-P3] KR102451751B1, ECG preprocessing method and STEMI detection method, Sep.2022.

[KR-P2] KR102346533B1, Road condition detection device and system, road condition detection method using the same, Dec.2021.

[KR-P1] KR102179040B1, Apparatus and Method for Anomaly Detection of SMD Assembly Device Operation based on Deep Learning, Nov.2020.

Certifications

NVIDIA DLI Instructor Certificate [link] Apr. 2022
NVIDIA

NVIDIA University Ambassador Certificate [link] Apr. 2022
NVIDIA

Big Data Analysis Engineer [link] Jul. 2021
Korea Data Agency *Republic of Korea*

NVIDIA DLI Certificate - Applications of AI for Anomaly Detection [link] May. 2021
NVIDIA

Activities

Journal Reviewer

Results in Engineering Apr. 2025 -

Computers and Electrical Engineering Feb. 2025 -

International Journal of Computational Intelligence Systems	Dec. 2024 -
Multimedia Systems	Dec. 2024 -
Discover Artificial Intelligence	Oct. 2024 -
IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT)	Sep. 2024 -
IEEE Signal Processing Letters	Aug. 2024 -
Journal of Nondestructive Evaluation	Mar. 2024 -
Electronics Letters	Jan. 2024 -
Signal, Image and Video Processing	Jan. 2024 -
Scientific Reports	Sep. 2023 -
The Journal of Supercomputing	Aug. 2023 -
IEEE Access	Jun. 2021 -

Conference Reviewer

IEEE International Joint Conference on Neural Networks (IJCNN)	2025
IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)	2025, 2026
IEEE International Conference on Big Data and Smart Computing (BigComp)	2025