HEEJUN YOON

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RESEARCH INTEREST

Machine Vision, Deep Learning: from understanding mechanism to its application to various domains in real world

EDUCATION

Ewha Womans University   *Seoul, Republic of Korea*
M.S. in Electronics and Electrical Engineering   *Mar 2023 - Aug 2024*
- Advisor : Prof. Jeongtae Kim, GPA : 4.0/4.0, 4.3/4.3

Ewha Womans University   *Seoul, Republic of Korea*
B.S. in Electronics and Electrical Engineering, Magna Cum Laude   *Mar 2019 - Feb 2023*
- Minor : Mathematics, Major & Minor GPA: 3.79/4.0, 3.90/4.3

PUBLICATION & CONFERENCES

[1] H. **Yoon**, "A Combined Twin and Single Network for Fast and Robust Inspection of IC Substrates," M.S. thesis, Ewha Womans University, 2024.

[2] H. **Yoon**, D. Yeom, S. Lee, and K. Lee, "Personal Mobility Safe Driving System with Knowledge Distillation," in *2023 IEEE 20th International Conference on Ubiquitous Robots(UR)*, 2023.

[3] H. **Yoon**, J. Park, and J. Kim, "Action recognition using 3d point cloud from frequency modulated continuous wave radar signals," in *2023 Image Processing and Image Understanding(IPIU)*, 2023.

[4] H. **Yoon**, D. Yeom, S. Lee, and K. Lee, "2-input Deep Learning based Multi-tasking Safe Driving," in *Fall Annual Conference of The Institute of Electronics and Information Engineers (IEIE)*, IEIE, 2022.

EXPERIENCE

Graduate Research Assistant (advisor : Prof. Jeongtae Kim)   *Mar 2023 – Jul 2024*
Digital Signal Processing Laboratory(DSPL), Ewha Womans University
- Led the development of an automatic inspection system for semiconductor products using deep-learning-based machine vision techniques

Undergraduate Research Assistant (advisor : Prof. Jeongtae Kim)   *Jul 2020 – Feb 2023*
Digital Signal Processing Laboratory(DSPL), Ewha Womans University
- Worked on radar signal processing and deep learning projects such as people counting, radar-based motion recognition, and pose estimation.

Ewha Electronics Innovation (advisor : Prof. Hyunggon Park)   *2019 – 2022*
Academic Club, Role as President in 2021
- Managed the academic club, leading project lectures on machine learning, Arduino, etc and provide guidance during project development.

HONORS & AWARDS

Full-tuition Scholarship based on merit | *Ewha Womans University*   *Mar 2023 - Aug 2024*
BK21 Overseas Training Scholarship | *Ewha Womans University, BK21 Plus*   *Jun 2023*
Kwanjeong Scholarship | *Kwanjung Educational Foundation*   *Mar 2021 – Feb 2023*
- Selected as a promising student and awarded a $18,000 scholarship over four semesters

Grand Prize in Undergraduate Thesis Competition | *IEIE*   *2022*
- Awarded at the IEIE Autumn Conference 2022 for the Undergraduate Thesis Competition, ⧉paper link

Gold Prize in Engineering Capstone Design Contest | *Ewha Womans University*   *2022*
Dean's List | *Ewha Womans University*   *Mar 2019 - Dec 2022*
Engineering Leadership Scholarship | *Ewha Womans University*   *2020*
Gold medal in AI-JAM Korea 2020 Competition   *2020*
- Topic : Youtube Q&A Clustering   (⧉Project page, ⦿Github)
- Developed a clustering model utilizing NLP techniques to automatically cluster question comments
- Role : constructing the overall algorithm including web scraping and tokenization, deliver of the final presentation

Semiconductor Products Inspection with Twin Network
Jan 2023 – Jun 2024

| *Advisor : Prof.Jeongtae Kim*

- Thesis for master degree
- Developed lightweight twin network-based IC-substrates defect detection system that is robust to mis-registration and characteristic difference
- Key technologies : Siamese Network, Change Detection, Attention, Knowledge Distillation, Vision Transformer

Personal Mobility Safe Driving System
Jul 2022 – Feb 2023

| *Advisor : Prof.Kahyun Lee*

- Developed a deep learning-based safety system specifically designed for personal mobility devices
- Submitted one international, one domestic conference papers based on this topic
- Role as a team : overall training of deep-learning models, hardware(Jetson Nano) setting and embedding, the application of knowledge distillation techniques
- Key technologies : Transfer Learning, Knowledge Distillation, Image Processing, Hardware Embedding

Estimation of Breathing and Heart Rates from 3D beamforming
Sep 2022 – Nov 2022

| *Advisor : Prof.Jeongtae Kim*

- Investigated an approach for estimating breathing and heartbeat rates utilizing 3D beamforming-based frequency modulated continuous wave (FMCW) radar signals
- Demonstrated superior performance compared to conventional 2D beamforming methods.
- Key technologies : Radar Signal Processing, Beamforming, Signal Analysis, Experimental Design and Execution

Integration of Deep Learning Techniques in Radar Signal Processing
Jul 2020 – Sep 2022

| *Advisor : Prof.Jeongtae Kim*

- *1) Fall Detection and Pose Estimation* - 3D point cloud generation, RNN, LSTM
- *2) People Counting from Radar Data* - 2D heatmap generation, CNN
- Key technologies : Radar Signal Processing, Deep Learning for Signals

Embedded Systems & Arduino Projects
Jul 2019 – Sep 2019

| *Club Activities, Class Projects, or Extracurricular activities*

- Participant of 2019 ZER01NE DAY (Creator Camp, Hyundai Motors, 2019) : Developed a glass harp and sand animation machine using an Arduino-based XY-plotting system.
- Real-time Wireless Motion Monitoring System (2022) : Created a wireless motion monitoring system for smart factory processes using Arduino and XBee communication modules.
- Club Exhibition Projects (2019, 2020)): Engineered a DDR pad with Arduino and pressure sensors in 2019, and developed an IoT clock with LED animations and 3D modeling in 2020.
- Key technologies : Arduino, IoT, Bluetooth, Embedding, Hardware Design

TEACHING & MENTORSHIP EXPERIENCE

Teaching Assistant
Digital Signal Processing | *College of Engineering, Ewha W. University* *Fall 2023*

Undergraduate Teaching Assistant
Calculus | *College of Natural Sciences, Ewha W. University* *Fall 2019, 2020; Spring 2020, 2021*
Introductory Creative Convergence Basic Design | *College of Engineering, Ewha W. University* *Fall 2020*

Electrical Engineering Major Mentoring
Head mentor in 2021 | *Department of Electrical Engineering, Ewha W. University* *2021,2022*

SKILLS

Language: Korean(Native), English(Fluent, TOEFL 104, TOEIC 970)
Programming: Python(TensorFlow, Pytorch, OpenCV), MATLAB(High), C/C++(Intermediate)
Mathematics and Major Courses
<Graduate Courses - 12 credits, all A+> - Deep Learning, Signal Processing, Big Data, CPS
<Mathematics - 34 credits, average 3.97/4.0> - Linear Algebra, Calculus, Analysis
<Engineering - 56 credits, average 3.7/4.0> - Signal Processing, Communication & Network, Embedded System