Junyong Park

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Research Interests: Wearable Sensing, Movement and Health Analysis, Foundation Models, Self-Supervised Learning

Experience

Apple **Pittsburgh, PA**
Research Intern, Mentor: Kareem Bedri *Mar. 2025 - Sep. 2025*

- Designed Time-Frequency Slot Attention, a self-supervised approach for learning structured representations from real-world wearable accelerometer signals, and pre-trained a foundation model on 2,500 hours of wrist motion data.
- Curated 11 IMU downstream tasks from diverse open datasets and evaluated the model on 16 sensing tasks, outperforming five SSL baselines on 13 tasks with a +4.5% average gain.
- Implemented a real-time Apple Watch prototype that runs multiple wearable sensing tasks using a shared model backbone and lightweight task-specific heads.

Education

KAIST (Korea Advanced Institute of Science and Technology) **Daejeon, South Korea**
Ph.D. in School of Computing (Advisor: Sungho Jo) *Mar. 2020 - Feb. 2026*

- GPA: 4.02/4.3

KAIST (Korea Advanced Institute of Science and Technology) **Daejeon, South Korea**
M.S. in School of Computing (Advisor: Sungho Jo) *Sep. 2018 - Feb. 2020*

KAIST (Korea Advanced Institute of Science and Technology) **Daejeon, South Korea**
B.S. in School of Computing *Sep. 2014 - Aug. 2018*

- Graduated with Honors (Cum Laude)
- Exchange student in UCSC, 2017 Summer

Publications

[Under review] SITRec: Semantic-Inertial Trajectory Recovery for Tennis Players from a Single Wrist IMU
Junyong Park *et al.*

[Under review] SlotFM: A Motion Foundation Model with Slot Attention for Diverse Downstream Tasks
Junyong Park, *Oron Levy, Rebecca Adaimi, Asaf Liberman, Gierad Laput, Abdelkareem Bedri*

[c.4] Silent Impact: Tracking Tennis Shots from the Passive Arm
Junyong Park, *Saelyne Yang, Sungho Jo*
UIST 2024: ACM Symposium on User Interface Software and Technology

[j.2] Asynchronous Motor Imagery BCI and LiDAR-based Shared Control System for Intuitive Wheelchair Navigation
Jin Woo Choi, ***Junyong Park***, *Sejoon Huh, Sungho Jo*
IEEE Sensors 2023

[j.1] Maximization and restoration: Action segmentation through dilation passing and temporal reconstruction
Junyong Park, *Daekyum Kim, Sejoon Huh, Sungho Jo*
Pattern Recognition 2022

[c.3] A Robot Capable of Proactive Assistance through Handovers for Sequential Tasks
Nayoung Oh, ***Junyong Park***, *Ji Ho Kwak, Sungho Jo*
UR 2021: International Conference on Ubiquitous Robots

[c.2] Dynamic Humanoid Locomotion Over Rough Terrain With Streamlined Perception-Control Pipeline
Moonyoung Lee, Youngsun Kwon, Sebin Lee, JongHun Choe, ***Junyong Park***, *Hyobin Jeong, Yujin Heo, Min-su Kim, Jo Sungho, Sung-Eui Yoon, Jun-Ho Oh*
IROS 2021: IEEE/RSJ International Conference on Intelligent Robots and Systems

[c.1] A SLAM Integrated Hybrid Brain-Computer Interface for Accurate and Concise Control
Junyong Park, *Jin Woo Choi, Sungho Jo*
International Winter Conference on Brain-Computer Interface 2019

Additional Research Projects

Bimanual Intention Inference for Wearable Hand Robots

- Implemented a Bayesian intention inference module that maps hand-object kinematics from egocentric RGB-D video to bimanual action intents.
- Integrated the module with point tracking and finite-state glove control to actuate grasp, release, finger press, axial rotation, normal translation, and hard press during daily tasks.

Wearable Sensor-Based Gait Phase Detection

- Developed methods to detect gait cycles, gait phases, and four running phases from strain, EMG, IMU, and force-sensor data.
- Built both deep learning models and lightweight state-machine methods for low-latency inference on a Teensy microcontroller.

Academic Service

Reviewer

- CHI 2026
- UIST 2026
- IMWUT 2026
- NordiCHI 2026
- Frontiers in Physiology 2026
- Discover Applied Sciences 2026
- Evolutionary Intelligence 2026
- Journal of Real-Time Image Processing 2026
- Scientific Reports 2025
- Frontiers in Sports and Active Living 2025
- IROS 2024

Teaching & Mentoring

Teaching Assistant

- KAIST CS101 Introduction to Programming; CS206 Data Structure 2019–2021
- KAIST CS270 Intelligent Robot Design and Programming; CS572 Intelligent Robotics 2018–2020

Research Mentoring

- KAIST Undergraduate Research Program Mentor Spring 2021, Spring 2022
- KAIST SoC Internship Program Co-op Mentor 2020–2021
- KSA Highschool Research Program Mentor; GIFTED Creative Research Program Pre-URP Mentor 2018–2021
- Samsung SDS Senior DS Education Program Mentor Jan. 2020–May 2021

Honors & Awards

- **Encouragement Award**, SW Talent Festival, Ministry of Science and ICT 2018
- **Dean's List**, School of Computing, KAIST Fall 2016, Fall 2017
- **LINE Scholarship**, School of Computing, KAIST 2017

Skills

Machine Learning

- Self-supervised pre-training and evaluation of sensor foundation models
- Time-series modeling, signal processing, and on-device inference
- Multimodal wearable and mobile sensing: IMU, EEG/BCI, LiDAR, RGB-D

Programming & Tools

- Python, PyTorch, NumPy, SciPy, pandas, scikit-learn
- C++, Git, Linux, Flutter, Kotlin, SwiftUI

Languages

- Korean (native), English (fluent)