

SEUNGJOO LEE

✉ Email: seungjoo.lee@kaist.ac.kr | 🏠 Website: seungjoo.com

RESEARCH INTERESTS

Mobile Sensing, Federated Learning, Large Language Model, Machine Learning for Healthcare

EDUCATION

- KAIST (Korea Advanced Institute of Science and Technology)** Sep 2024 - Present
Ph.D. in Electrical Engineering
Advised by [Sung-Ju Lee](#)
- KAIST (Korea Advanced Institute of Science and Technology)** Sep 2022 - Aug 2024
M.S. in Electrical Engineering
Total GPA : 4.17/4.3
Advised by [Sung-Ju Lee](#)
- KAIST (Korea Advanced Institute of Science and Technology)** Mar 2016 - Aug 2022
B.S. in Computer Science major
Major GPA : 4.13/4.3 | Total GPA : 4.0/4.3
🏆 *Graduated with Honors (2nd place out of 715 students)*
🏆 *Summa Cum Laude*

PUBLICATIONS

(C: Conference, D: Demo, B: Book)

- [C3] (FL)²: Overcoming Few Labels in Federated Semi-Supervised Learning**
Seungjoo Lee, Thanh-Long V. Le, Jaemin Shin, Sung-Ju Lee
Conference on Neural Information Processing Systems (**NeurIPS**) 2024
Top ML Conference - Acceptance rate 25.8%
- [C2] FedTherapist: Mental Health Monitoring with User-Generated Linguistic Expressions on Smartphones via Federated Learning**
Jaemin Shin, Hyungjun Yoon, **Seungjoo Lee**, Sungjoon Park, Yunxin Liu, Jinho D. Choi, Sung-Ju Lee
Conference on Empirical Methods in Natural Language Processing (**EMNLP Main**) 2023
Top NLP Conference - Acceptance rate 21.3%
- [C1] MyDJ: Sensing Food Intakes with an Attachable on Your Eyeglass Frame**
Jaemin Shin, **Seungjoo Lee**, Taesik Gong, Hyungjun Yoon, Hyunuchul Roh, Andrea Bianchi, Sung-Ju Lee
Conference on Human Factors in Computing Systems (**CHI**) 2022
🏆 **Best Paper Honorable mention award (top 5%)**
Top HCI Conference - Acceptance rate 24.7%
- [D1] Accurate Eating Detection on a Daily Wearable Necklace (Demo)**
Jaemin Shin, **Seungjoo Lee**, Sung-Ju Lee
International Conference on Mobile Systems, Applications and Services (**MobiSys**) 2019
- [B1] High School Arduino**
Comprehensive guide on conducting scientific experiments using Arduino
Chapter 4, 7, and 13 are written by me

RESEARCH EXPERIENCE

Microsoft Research

Sep 2024 - Present

Research Intern, Advised by [Lili Qiu](#)

Applied machine learning research on sensor data, targeting healthcare applications.

KAIST Network and Mobile Systems Lab

Dec 2018 - Present

Graduate Student & Undergraduate Research Intern, Advised by [Sung-Ju Lee](#)

- **Enhancing Visual LLM Reasoning Capability**
Advancing multi-hop visual LLM reasoning via dynamic input adjustments during inference.
- **Federated Learning for Medical Applications (Lead)**
Addressing the costly labeling process in medical applications through weak supervision.
- **Federated Semi-Supervised Learning with Label Deficiency (Lead) [C3]**
Mitigating the label deficiency problem of federated semi-supervised learning for its practical applications.
- **UWB-Based Personal Mobility Warning System for Pedestrians**
UWB-based sensing of approaching Personal Mobility (PM) and warning pedestrians to prevent collision.
- **Smartphone-Based Early Depression Diagnosis with a User's Daily Linguistic Expressions via Federated Learning [C2]**
Implemented federated learning framework. Experimented preprocessing long input for LLMs. Reproduced existing paper to handle clients with only positive label. Pre-training LLMs with large corpus and distillation of pre-trained model into small models. Did the experiments about resource efficiency (computation, memory, battery) on various mobile devices.
- **Sensing Food Intakes with an Attachable on Your Eyeglass Frame [C1, D1]**
Designing an novel wearable device that can be easily attached to eyeglass frames, capable of eating detection. Contributed the whole research process; problem definition, implementation, and user study.

KAIST Computer Architecture & Systems Lab

Mar 2018 - Jun 2018

Individual Research, Advised by [Jaehyuk Huh](#)

Worked on optimizing TLB shutdown by conducting an in-depth analysis of the Linux kernel with cscope, ctags, and ftrace. Investigated and identified unnecessary TLB shutdowns using ftrace and systemtap.

PATENTS

- [P3] "Adaptive State-Space Model-Based Deep Learning System for Real-Time Data Inference on Mobile Devices", Sung-Ju Lee, Seungjoo Lee, HyungJun Yoon, Korea patent (In progress)
- [P2] "System and Method for Monitoring Mental Health Based on Smartphone User Language Expressions Through Federated Learning", Sung-Ju Lee, HyungJun Yoon, Seungjoo Lee, Jaemin Shin, Korea patent (Filing date: 2024.10.04, No. 10-2024-0135031)
- [P1] "Artificial Intelligence Model Training Method and Apparatus for Voice Phishing Detection", Sung-Ju Lee, Seungjoo Lee, HyungJun Yoon, Korea patent (Filing date: 2023.10.04, No. 10-2023-0131748)

AWARDS & HONORS

KAIST Breakthroughs

Spring 2023

Biannual KAIST webzine showcasing groundbreaking works

Winner of the Graduate of the Year Award (KAIST Board of Trustee Chairpeson's Prize)

Feb 2023

2nd place out of 715 students, awarded to top 5 students (0.7%) who demonstrated outstanding performances in various activities as well as in grades. Awarded at the commencement ceremony

| | |
|---|------------------------|
| KAIST Summa Cum Laude Awarded for achieving the highest academic performance among students | Sep 2022 |
| Engineering Innovator Award Awarded to students showing outstanding performance in extracurricular activities, including academic publications, entrepreneurial activities, exhibitions, and inventions Five students are picked from college of engineering each semester | Sep 2022 |
| Honorable Mention Award Awarded to top 5% of all submissions in CHI 2022 | Mar 2022 |
| U.S. Army Certificate of Appreciation Awarded for exemplary service during military duty, serving as a role model for others | Jul 2021 |
| Dean's List Awarded to top 3% among 2,900+ students in College of Engineering | Spring 2019, Fall 2019 |
| National Excellence Scholarship National scholarship to students who showed excellence | Fall 2018 - Fall 2019 |
| Samsung Humantech Paper Award Fourth prize on "An optimal path of navigation based on fractal dimension" | Spring 2015 |

INVITED TALKS

| | |
|---|----------|
| MSRA Intern Tech Talk, MSRA Overcoming Few Labels in Federated Semi-Supervised Learning | Nov 2024 |
|---|----------|

TEACHING EXPERIENCES

| | |
|--|-------------|
| Computer Network (EE323) Head of teaching assistants (Prof. Sung-Ju Lee) | Spring 2024 |
| Operating Systems and System Programming for Electrical Engineering (EE415) Teaching assistant (Prof. Sung-Ju Lee) | Fall 2023 |
| Programming Structures for Electrical Engineering (EE209) Teaching assistant (Prof. Sung-Ju Lee) | Spring 2023 |

MENTORING EXPERIENCES

| | |
|---|---------------------|
| Seoyoung Park Undergraduate research intern at NMSL Doing a research project about <i>federated learning</i> together | Jun 2024 - Oct 2024 |
| Thanh Long Le Viet Undergraduate research intern at NMSL Doing a research project about <i>federated learning</i> together | Oct 2023 - May 2024 |
| Rachel Kim Undergraduate research intern at NMSL Doing a research project about <i>UWB-based personal mobility warning system for pedestrians</i> together | Dec 2023 - Feb 2024 |

ACADEMIC SERVICES

Conference Reviewer

- International Conference on Mobile Systems, Applications, and Services (**Mobisys**), 2023-2024
- International Conference On Mobile Computing And Networking (**MobiCom**), 2023-2025
- Special Interest Group on Data Communication (**SIGCOMM**), 2023

- international Joint Conference on Pervasive and Ubiquitous Computing (**UbiComp**), 2022

Outreach

- **Educational Support for Students in Difficult Circumstances** Mar 2020 - Jun 2021
Taught math and science to 4 middle school students for 2 hours every week (total ~136 hours)
- **Mentor for the Gifted Education Program, SW/AI Camp** Summer 2022
Facilitated a 2-night, 3-day program for elementary and middle school students, focusing on creating SW/AI-related kits, providing career mentoring, and conducting quizzes
- **CS101 Tutor** Spring 2017, Fall 2017, Spring 2022
Taught 5 freshman studying CS101 (introduction to programming)

EXTRA-CURRICULAR ACTIVITIES

- KATUSA (Korean Augmentation to the U.S. Army)** Dec 2019 - Jun 2021
Served national service at eighth army as a KATUSA
Provided translation between the U.S. and Korean army
- International Students Organization (ISO)** Sep 2016 - Dec 2019
Introduce Korean culture to international students
- Flute Player in Cantabile (Orchestra)** Mar 2014 - Jan 2016
- Embedded Software Club** Mar 2014 - Dec 2015
Been a club leader for a year
Published book about doing scientific experiments using Arduino [B1]