Joohan Lee

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EDUCATION

University of Southern California	Los Angeles, CA
M.S. in Computer Science	Jan. 2022 – Dec.2023
Yonsei University	Wonju, South Korea
B.E. in Computer Engineering	Mar. 2015 – Feb. 2021

PROFESSIONAL EXPERIENCES

Samsung SDS America — Ridgefield Park, NJ · Oct. 2024 – Current
Gen AI Software Engineer

- Designing and developing a multimodal retrieval-augmented generation (RAG) pipeline to enhance domain-specific information retrieval performance.
- Architecting and implementing production-ready LLM applications for financial services, including an AI-powered policy guidance system and a data analytics platform with advanced visualization capabilities.

University of Southern California — Los Angeles, CA · Dec. 2022 – May. 2024
Graduate Research Assistant

- Built an LLM-based on-device AI communication framework using Tensorflow to simulate the physical layer communications on a Linux server.
- Developed diverse machine learning pipelines using PyTorch and TensorFlow, along with Python, Numpy, Linux, and Slurm to train language, computer vision, or generative AI models that drove substantial improvements across multiple applications.

Purdue University — Los Angeles, CA (Remote) · May. 2022 – Apr. 2023
Research Intern

- Developed WikiSER, a high-quality dataset of 1.7M sentences with 79K labeled software entities, achieving an 8.62% reduction in error rate compared to existing benchmarks.
- Implemented self-regularization, a noise-robust learning approach for training SER models, and achieved a 7.1% F1 score improvement over a state-of-the-art model in noisy conditions.

PROJECTS

Integrating Pre-Trained Language Model with PHY Communications [GitHub] — Feb. 2023 - Feb. 2024

- Integrated the language model (BART) into a realistic 5G NR simulator, enhancing communication efficiency.
- Applied vector quantizing into the AI communication system, resulting in 10% noise-robustness and 50% compression.

Generative Model for Channel Feedback Compression — Dec. 2023 - Apr. 2024

- Implemented a PyTorch-based framework for NR-MIMO channel prediction leveraging generative AI models (e.g., VQ-VAE).

Computer Vision-based Large-scale Channel Prediction — Dec. 2022 - Jun. 2023

- Developed a PyTorch-based machine learning framework, enhancing model accuracy by 18% through optimization of model architecture, fine-tuning, and data augmentation.
- Secured **1st place** in the ML competition (IEEE ICASSP Radio-Map Prediction Challenge [2]), outperforming competitors by achieving the highest accuracy.

PUBLICATIONS

[1] Ju-Hyung Lee, Dong-Ho Lee, Joohan Lee, Jay Pujara. "Integrating Pre-Trained Language Model with Physical Layer Communications", IEEE Transactions on Wireless Communications [LINK]

[2] Ju-Hyung Lee, Joohan Lee, Seon-Ho Lee, Andreas F. Molish. "PMNet: Large-Scale Channel Prediction System for ICASSP 2023 First Pathloss Radio Map Prediction Challenge," IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) [LINK]

[3] Tai Nguyen, Yifeng Di, Joohan Lee, Muhao Chen, Tianyi Zhang. "Software Entity Recognition with Noise-Robust Learning", In 38th IEEE/ACM International Conference on Automated Software Engineering (ASE '23) [LINK]

SKILLS

Programming Languages	Python, C/C++, JavaScript, TypeScript, Java, JSP, SQL, HTML, CSS, VBA
Technologies	PyTorch, TensorFlow, NLP, Deep Learning, Linux, Slurm, Node.js, Flask, MySQL, React, AWS, Bedrock, Langchain

HONORS and AWARDS

1st-rank award in IEEE ICASSP Signal Processing Grand Challenges (ML competition) [2]	Jun.. 2023
3rd-rank award in the IMSC SW Pioneer Hackathon at University of Southern California	Jul. 2022
3rd-rank award in the Capstone Design Competition at Yonsei University (IoT Smart Mirror using Gen AI)	Nov. 2020