

# Joohan Lee

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## EDUCATION

### University of Southern California

M.S. in Computer Science

Los Angeles, CA

Jan. 2022 – Dec. 2023

### Yonsei University

B.E. in Computer Engineering

Wonju, South Korea

Mar. 2015 – Feb. 2021

## PROFESSIONAL EXPERIENCES

### Samsung SDS America

Gen AI Software Engineer

Ridgefield Park, NJ

Oct. 2024 – Current

- **Led the development of an AI-powered mortgage processing product zero to one** by architecting and implementing the full-stack (React/Electron, Flask) and AI/RAG pipelines, resulting in securing initial enterprise banking contracts with new partners.
- Developed an **LLM-powered sales data analyzer** from scratch, leveraged prompt engineering and agentic tools, and improved response accuracy by 20% over the baseline.
- Designed and implemented a multimodal retrieval-augmented generation (RAG) pipeline enhancing domain-specific information retrieval and generation performance, using LangChain, HuggingFace, Milvus, and AWS Bedrock.

### University of Southern California

Graduate Research Assistant

Los Angeles, CA

Dec. 2022 – May. 2024

- 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

Research Intern

Los Angeles, CA (Remote)

May. 2022 – Apr. 2023

- 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.

## 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).

### Deep Learning-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, Muhamo 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, HPC, Slurm, Node.js, Flask, MySQL, React, AWS, HuggingFace, Bedrock, Langchain, Milvus, Git, Nginx, Gunicorn

## 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