

# 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

- **Built AI mortgage processing system** automating financial document analysis and 1003 form generation with intelligent chatbot assistance, achieving 20% accuracy improvement through multimodal RAG pipeline (LangChain, AWS Bedrock, Milvus)
- **Deployed full-stack production application** (Flask, React, AWS EC2) for real-time mortgage document processing, implementing secure authentication, document management, and compliance monitoring for enterprise lending workflows.

### 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.
- 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).

### 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