Junhyeok Lee

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Summary

Research Engineer specializing in scalable healthcare AI across multiple domains: biomedical imaging, biosignal analysis, pharmacogenomics, and computational biology.

Work Experience

Teaching Assistant, BIOE 437/537 Computational Systems Biology Fall 2025 - Present
University of Washington, Prof. Herbert M. Sauro

Research Engineer / Monitor Corporation Jul 2023 - Jun 2025

- Language-Guided Denoising Diffusion Model: Built production-ready diffusion model robust to multi-vendor ultrasound hardware, reducing false positives by **89%** under clinical standards.
- 3D Vision-Language Segmentation Network: Designed frequency-domain segmentation model with Fast Fourier Convolution and multimodal fusion, achieving **0.72 Dice** on complex multimodal imaging data.
- Scalable Auto-Segmentation Pipeline: Deployed SAM inspired pipeline (1:73 labeled-to-unlabeled ratio), generating lesion-level masks at scale and reducing manual labeling by **98.6%** while surpassing supervised baselines.
- Custom Evaluation Metrics: Developed Conditional Overlap Coefficient (CoC) with adaptive normalization, enabling real-time, numerically stable evaluation in production.

Projects

Brain Trauma Injury Foundation Model / Harborview Medical Center Link
Tuberculosis Cough Classification / Prof. Shwetak N. Patel Link
Burn Diagnosis AI Challenge / Seoul National University Hospital Link
Assistive Communication System for ALS / Prof. Yoonho Nam Link

Education

2025 - 2026 **M.S. in Bioengineering**, University of Washington Expected
2018 - 2024 **B.S. in Biomedical Engineering**, Hankuk University of Foreign Studies GPA: 3.9/4.0
2018 - 2024 **B.S. in Economics**, Hankuk University of Foreign Studies GPA: 3.5/4.0

Publications

Lee, Junhyeok et al. (Apr. 2023). "Bias Field Correction in MRI with Hampel Noise Denoising Diffusion Probabilistic Model". In: *Proceedings of Medical Imaging with Deep Learning (MIDL)*. Link, pp. 1–15.

Lee, Junhyeok (Feb. 2024). "Deep Clustering of Single-cell RNA-seq with Combined Features". B.S. Thesis. Hankuk University of Foreign Studies.

Lee, Junhyeok et al. (2025). "Drug Response Prediction with Tissue Specificity". In: *Bioinformatics*. under review.

Skills

Programming Languages	Python, R, SQL, C/C++, PyTorch, TensorFlow
Systems/Infrastructure	GPU Computing, Distributed Training, Production ML Pipelines, Docker
Research & Analytics	Statistical Analysis, Mathematical Modeling, Clinical Validation