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Youngung Han, Ph.D. Candidate

010-9676-1727 | | |

전문연구요원 전직 희망

Education

SNU (Seoul National University) — Seoul, Korea
Ph.D. Candidate, Computer Science and Engineering — *Sep 2019 – Aug 2023*

KNUT (舊 韓國鐵道大學) — Uiwang, Korea
B.A. Double major in Railroad Management and Logistics — *Mar 2017 – Aug 2019*

KNUT (舊 韓國鐵道大學) — Uiwang, Korea
B.S. Computer Science and Information Engineering — *Mar 2015 – Aug 2019*

- GPA: 3.83/4.5
- Credits Earned: 167

Experience

Rookie — Sep 2025 – Present
WAFFLE *Wafflestudio* — *Seoul, Korea*

- Selected for admission into premier student web/app development organization renowned for developing high-impact services including SNUTT and "식샤" (Siksha) that serve thousands of SNU students daily.
- Accepted into selective backend development track focusing on FastAPI framework and service development.

Senior Research Engineer — Mar 2025 – Present
AIDEEP *AIDEEP* — *Gwacheon, Korea*

- Revolutionized object detection pipeline by consolidating a complex two-stage detection and recognition system into a unified YOLO-based architecture with 12 specialized classes, achieving exceptional accuracy (mAP@50: 0.96, mAP@70: 0.7-0.8) while dramatically reducing deployment complexity and operational overhead.
- Pioneered the first comprehensive Korean machine unlearning evaluation dataset addressing critical gaps in multilingual privacy compliance, constructing forget set and retain set from Korean literary corpus with systematic GPT-4-based question-answer pair generation pipeline designed to capture the rich vocabulary and emotional nuances of Korean language, achieving 95% literal text fidelity through character-level token validation and 87% semantic-conceptual alignment through contextual meaning verification.
- Developed and implemented a comprehensive multi-layer safety framework for Deepchat LLM, integrating blacklist filtering, LLM self-check validation, topical-rail enforcement, and 1:1 question-answer mapping protocols, achieving superior guardrail performance in blocking inappropriate content (precision: 64.3% → 98.0%, recall: 76.6% → 96.7%) for Korean university admissions platform.
- Successfully launched and gained official recognition from Korean Council for University Education (KCUE) for enhanced information reliability, with deployment on the national "대학어디가" (Where to Go to College) platform serving thousands of students.
- Engineered end-to-end RAG-based conversational AI system with three specialized modules: input processing with DeepChat interface integration, vector embedding with semantic retrieval optimization, and answer generation leveraging LLM with Direct Preference Optimization (DPO) training using multi-scenario negative datasets.

Assistant Research Engineer — Dec 2023 – Mar 2025
AIDEEP *AIDEEP* — *Gwacheon, Korea*

- Pioneered lightweight Transformer-based deep hashing model through knowledge distillation applied to Vision Transformer (ViT) backbone, outperforming previous CNN-based methods by up to 39.4% in mAP on CIFAR10.
- Co-developed industry-leading dual-module copyright protection system utilizing Convolutional Variational Autoencoder (CVAE) for infringement detection and innovative ViT-based hashing model for image recommendation, achieving state-of-the-art performance (mAP: 0.812 on Flickr25k) with 95% user satisfaction among 65 educators.
- Designed and implemented advanced PII de-identification system using Named Entity Recognition (NER) model, overcoming data scarcity challenges through GPT-generated synthetic data augmentation and granular class decomposition strategy, achieving F1-score exceeding 0.90 on internal validation sets.

- Innovated conditioning framework for identity-preserving facial feature injection into both GAN and diffusion-based face-swapping pipelines, enabling high-fidelity synthesis and establishing foundation for commercial deployment while outperforming Electronics and Telecommunications Research Institute (ETRI)'s face-swapping model on CCTV datasets.
- Developed hybrid deepfake detection system with specialized CNN-based detectors for each forgery type, incorporating Fourier transform features for GAN-based detection and custom diffusion loss for diffusion-generated fakes, achieving substantial performance improvement (F1-score: 0.56 → 0.73).

Medical AI Researcher Nov 2024 – Present

SNU Medical AI *Seoul, Korea*

- Advised by Prof. Namjoon Kim (SNU), Prof. Wookyoung Jeong (Sungkyunkwan University (SKKU), Samsung Medical Center (SMC)), and conducted in collaboration with the **NVIDIA** HongKong and Taiwan.
- First-author on FOSCU; developed a dual-stage Duo-Diffusion system to simultaneously synthesize anatomically accurate MRI volumes and segmentation labels for liver, enabling spatially consistent medical data augmentation and overcoming annotation bottlenecks, with 36.4% lower FID and +0.67% Dice on 720 cases.
- As team leader, architected a full end-to-end pipeline that processes whole 3D abdominal MRI volumes as input to automatically predict perineural invasion (PNI)—a critical prognostic factor in cancer—by designing a CNN-based model with a dedicated preprocessing module for tumor ROI extraction and generating synthetic training data using a diffusion model optimized via Direct Preference Optimization (DPO), achieving an AUC of 0.78. Submitted to AAAI 2026.

Executive & Mentor Oct 2023 – Present

OUTTA *Seoul, Korea*

- Established strategic partnerships with prestigious academic and industry institutions including SNU Global Education Center for Engineers, SNU Innovative Engineering Education Center, ChannelTalk, and Hanwha DreamPlus.
- Led an AI **paper study group** for 8 members and mentored over 586 participants in the **OUTTA AI Bootcamp**, guiding them from foundational concepts to hands-on project completion with a 86% satisfaction rate.
- Authoring educational series covering AI Fundamentals, Machine Learning, and Natural Language Processing, scheduled for publication between late 2025 and early 2026.
- Played a key role in developing and refining the bootcamp curriculum, contributing to its reputation as a leading practical AI education program in the community.

Undergraduate Research Assistant Dec 2018 – Mar 2019

Sogang University *Seoul, Korea*

- Advised by Prof. Hyung-Min Park.
- Successfully completed a graduate-level Digital Signal Processing project by designing and implementing an adaptive FIR filter (LMS algorithm) in MATLAB. The system effectively identified an unknown system's coefficients and recovered the original clean signal from noisy outputs, demonstrating a strong grasp of applying theoretical concepts to practical engineering problems.

Undergraduate Research Assistant Jan 2018 – Jul 2018

KNUT (舊 韓國鐵道大學) *Uiwang, Korea*

- Advised by Prof. Sang-Moon Lee and Prof. Song-wook Lee.
- Engineered a logistics optimization system that determined minimum-cost transportation routes by integrating a Selenium web crawler for real-time data acquisition with the Gurobi optimization solver.
- Developed a robust spam email classifier leveraging both Support Vector Machine (SVM) and Naive Bayes algorithms, achieving high classification accuracy through advanced feature engineering techniques.

Selected Papers

International Conference 2018 – Present

- Kim, K., **Han, Y.**, Ju, S., Jean, Y., Kim, Y., Choi, M., Park, K., Lim, S., Baek, S., Hyeon, S., Kim, N.-J., Lee, H.-J. (2025). CIPHER: Counterfeit Image Pattern High-level Examination via Representation for GAN and Diffusion Discriminator Learning. In Proceedings of the 2025 IEEE/EIE International Conference on Consumer Electronics-Asia (ICCE-Asia). IEEE.
- **Han, Y.**, Kim, K., Ju, S., Jean, Y., Cha, M., Park, S., Jung, H., Kim, N.-J., Jeong, W. K., Liao, K. Y.-K., Lee, H.-J. (2025). FOSCU: Feasibility of Synthetic MRI Generation via Duo-Diffusion Models for Enhancement of 3D U-Nets in Hepatic Segmentation. In Proceedings of the 2025 IEEE Asia-Pacific Conference on Circuits and Systems (APCCAS). IEEE.

- Kim, S., Kim, Y., Min, S., **Han, Y.**, Lim, J., Kim, I., Kim, W. (2024, October). Transformer-Based Unsupervised Deep Hashing Using Knowledge Distillation for Image Retrieval. In 2024 3rd International Conference on Artificial Intelligence and Software Engineering (ICAISE) (pp. 7-11). IEEE.

Domestic Conference 2018 – Present

- Cha, M., **Han, Y.**, Bae, J., Lee, J., Jeon, W., Lee, S., Kim, N., Lee, H., Kim, K., Chu, H., Eom, I., Kwon, M., Jang, H., Park, S., Lim, S., Park, S., Yoo, K., Kim, S., Park, M., Jung, W., Min, J., Hong, P., Lee, W. (2025). Medical Volume Synthesis using a Label-Guided 3D Latent Diffusion Model with ControlNet Guidance. In Proceedings of the 2025 IEIE Summer Conference. Institute of Electronics and Information Engineers.
- **Han, Y.**, Song, C., Jung, H., LEE, S. (2018). Logistics Transportation System using Bigdata. In Proceedings of the Korean Society of Computer Information Conference (pp. 486-488). Korean Society of Computer Information.

International Journal 2024 – Present

- Kim, Y., Kim, S., Min, S., **Han, Y.**, Lee, O., Kim, W. (2024). A Dual-Module System for Copyright-Free Image Recommendation and Infringement Detection in Educational Materials. Journal of Imaging, 10(11), 277.

Projects

DiffGAN-Detect | *Python, Pytorch, Colab, Diffusion, GAN* May 2025 – Jul 2025

- Developed a robust deepfake detection pipeline by first generating a comprehensive GAN-based forgery dataset using 30,000 CelebA images via ProGAN and extracting the pre-trained discriminator as a baseline detector for GAN artifacts.
- Enhanced model robustness and generalization by fine-tuning with an additional 3,000 FFHQ and synthetic images generated using a Denoising Diffusion Probabilistic Model (DDPM).
- Engineered a hybrid detection model capable of identifying both GAN- and diffusion-based deepfakes, leveraging recent research showing that diffusion-trained detectors generalize better to unseen GAN forgeries.
- Fine-tuning with diffusion-generated data improved the F1-score by 0.06 over the GAN-only baseline, demonstrating the effectiveness of hybrid training for cross-domain deepfake detection.
- Optimized all training and inference on Google Colab with strict memory constraints, and validated the pipeline's performance by experimenting on a diverse collection of real and fake data.

Deep Diffusion Model for Unsupervised Learning | *Python, Pytorch, Diffusion* Jan 2025 – Mar 2025

- Implemented deep diffusion probabilistic model using nonequilibrium thermodynamics principles for unsupervised generative learning.
- Developed complete training and inference pipeline supporting MNIST and Swiss Roll datasets with modular architecture.
- Built neural network architecture with Gaussian time encoding and MLP-based denoising for reverse diffusion process.
- Achieved flexible generative modeling by converting simple Gaussian noise to complex data distributions through iterative diffusion.

OUTTA Gen AI Team Leadership | *Python, Pytorch, Diffusion, GAN, NLP* Dec 2024 – Present

- Developed and led an interdisciplinary research team focusing on CNNs, Diffusion Models, GANs, and NLP, fostering collaboration between AI experts and novices.
- Organized weekly meetings for deep reviews of foundational and recent AI papers including transformer models and medical AI.
- Supervised diverse team members from multiple universities to contribute effectively to integrated projects.

MS-Clip-GAN | *Python, Pytorch, Multi-stage, GAN, Clip* Dec 2022 – Sep 2023

- Developed a multi-stage conditional GAN for text-to-image synthesis on 30,000 MM-CelebA-HQ dataset, each image paired with 10 captions.
- Implemented data preprocessing to extract and store CLIP embeddings in advance, optimizing training efficiency by avoiding on-the-fly computation.
- Designed and implemented a 3-stage progressive generation pipeline with Conditioning Augmentation and Semantic Spatial-Aware attention, achieving high-resolution 256×256 image synthesis from textual prompts under strict resource constraints.
- Built a modular training and inference framework supporting batch processing and multi-GPU training, and incorporated adversarial, contrastive, and mixed loss functions for enhanced image quality and semantic consistency.

Honors & Awards

Honors Mar 2020

- Songyee Yoon – Taekjin Kim Scholarship, NCSoft, 2020

Awards Jul 2018

- Outstanding Paper Award, Korea Society of Computer Information, 2018

Licenses & certifications

Engineer Big Data Analysis Jul 2024 – Present
Certified Professional Logistician Jul 2023 – Present
SQLD Sep 2022 – Present
Engineer Information Processing May 2018 – Present

Teaching Experience

Computer Concepts and Practice, SNU Spring 2020
DataBase, SNU Fall 2020
Computer Concepts and Practice, SNU Spring 2021
Intro Data Science, SNU Fall 2021
Introduction to Data Mining, SNU Spring 2022
Computer Concepts and Practice, SNU Spring 2023
Intro Machine Learning and Deep Learning, Samsung DSDS Spring 2020 – Spring 2022

Courses

KOCW Feb 2023 – Present

- Linear Algebra
- Probability and Statistics
- Introduction to Analysis
- Mathematical Statistics
- Advanced Calculus
- Algorithms
- Basic Applied Mathematics

KMOOC Apr 2017 – Present

- Economic Statistics
- Mathematics for AI
- Linear Algebra for Deep Learning
- Statistical Learning Theory for AI Researchers
- Neural Network and Mathematical Foundations
- Image Processing and Pattern Recognition
- Generative Models and Visual Intelligence
- Advanced Deep Learning: From CNN to GAN
- Machine Learning

Technical Skills

Languages: Python, C
Frameworks: PyTorch, FastAPI, MONAI, Redis
Libraries: NumPy, Pandas, Matplotlib, Seaborn, Scikit-learn, Hugging Face, Diffusers, LangChain
Developer Tools: Git, Docker, VS Code, PyCharm, Jupyter Notebook, Conda