

Chang Hyun Song

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PROFILE

Passionate AI developer specializing in **Computer Vision, Medical AI, and Image Generation** with a focus on **Data-Centric AI**. Extensive experience in AI model development leveraging diverse **medical datasets** from university hospitals. Expertise spans **data preprocessing, large-scale dataset handling, AI model training, and validation** in collaboration with various institutions and hospitals.

EDUCATION

M.S. in Bio Engineering & M.S in innovative medical science

Seoul National University, South Korea | March 2022 - February 2025

Seoul National University Hospital, iRail Lab (Advisor: Prof. Changmin Park)

GPA: **3.6/4.3**

Relevant Coursework: Deep Learning for Medical AI, Vision AI, Image Generation

Thesis: High-Resolution Chest Synthesis Data Generation for Medical Image Analysis: An Advanced GAN Approach with Conditional Image Synthesis

B.S. in Robotic Engineering

Kwangwoon University, South Korea | March 2014 - August 2021

GPA: **3.83/4.5**

Hanyang University High School

Seoul, South Korea | March 2010 - February 2013

Professional Experience

AI Researcher (Contract), AIVIS Inc.

Corporate R&D Center | April 2025 – October 2025

- **Developed real-time object detection models for pathology images** using RT-DETR and D-FINE architectures.
Built end-to-end training pipelines, benchmarked COCO-format datasets, and improved detection accuracy in histopathological tasks.
Tech Stack: RT-DETR, D-FINE, COCO-format, Transformer, PyTorch
- **Designed and implemented classifier modules** to enhance cell-level box predictions from detection outputs, boosting classification accuracy for HER2, KI67 staining

intensity grades.

- **Led the development of a self-supervised pathology-specific Foundation Model.**
Constructed a feature encoder pre-trained on diverse WSI datasets using masked image modeling and contrastive learning.
Verified its transferability to multiple downstream tasks (cell detection, classification, segmentation) across heterogeneous pathology domains.
→ **3rd place 2025 MICCAI UNICORN Challenge - Pathology Vision**
- **Developed a HER2 Scoring System** using vectorized image features from tumor cells.
Converted detection outputs into interpretable feature vectors and established a continuous scoring framework reflecting HER2 expression intensity at patch- and slide-level.

Research Experience

Research Assistant, iRail Lab, Seoul National University Hospital

[March 2022 - January 2025]

- Led AI model development for **high-resolution synthetic emergency imaging** in collaboration with **Asan Medical Center & Promedius**.
- Developed **conditional image synthesis models for chest X-ray datasets** (1M+ images).
- Validated synthetic data efficacy through **real-world AI model applications**, achieving near **commercial-level performance**.
- Conducted **federated learning** experiments to train models across multiple hospitals.
- Organized the **Medical Synthetic Data AI Challenge** to assess real-world validation outcomes.
- **Pneumoperitoneum Detection on Abdominal CT (KCR 2024):**
 - Developed a **ConvNeXt-based pneumoperitoneum detection model** achieving **99% AUC**.
 - Applied **transfer learning with ImageNet-pretrained models**, enhancing **external datasets(3 hospital) performance (>90% AUC)**.
 - Built **GradCAM-based visualization & web prototype** for AI-assisted diagnosis.
- **Medical Report Generation from CXR using VLM:**
 - Contributed to **Vision-Language Model (VLM)-based medical report generation**.
 - Focused on **multimodal learning integration** for clinical accuracy improvement.

Research Intern, iRail Lab, Seoul National University Hospital

[March 2021 - February 2022]

- Developed **synthetic data generation pipelines** for **X-ray, CT, and MRI images**.
- Led **data preprocessing and augmentation strategies** for medical AI applications.
- Organized weekly **Medical AI seminars**, discussing **cutting-edge research papers** and conference presentations.

Research Intern, UX AI Lab, Seoul National University

[September 2020 - November 2020]

- Developed **chatbot services** using **Google Cloud Platform (GCP), Firebase, and Dialogflow**.
- Conducted **UX research** on chatbot interactions with Google AI speakers for single-person households.

Research Intern, Robotics & AI Lab, Kwangwoon University

[December 2019 - February 2020]

- Worked on **SLAM & localization** using **Kalman Filters and computer vision algorithms**.
- Gained experience in **deep learning (CNN, RNN, Reinforcement Learning)** for robotic applications.

Projects

Synthetic Emergency Imaging & AI for Triage

- Developed **high-resolution (1024x1024) conditional training models** for **chest X-ray synthesis**.
- Conducted **benchmarking experiments** with **Diffusion Models, VAE, VQ-VAE, and Autoregressive models (LDM, Faster-DiT, VAR)**.
- Validated synthetic data effectiveness through **competitive AI challenges**.

Pneumoperitoneum Detection in Acute Abdominal Pain Patients

- Developed **state-of-the-art deep learning models** achieving **high external dataset AUC scores**.

Chatbot Service Development (Dialogflow & GCP Firebase)

- Implemented **Google AI speaker-integrated chatbot services** for user experience research.

Home Health Device for Smart Training (Capstone Project)

- Led team project on **motor-controlled smart training equipment** development.

Certifications and Trainings

Certifications & Training

- **Medical Imaging AI Specialist Training Program** – Korea Human Resources Development Institute for Health
 - Developed **Alzheimer's detection models** using **Brain MRI** (2D/3D classification).
- **Advanced Medical Data Analysis Program** – KOHI & Asan Medical Center
 - Led a **lung cancer nodule detection project** using **LIDC-IDRI lung CT dataset**.

Honors & Awards

3rd place – MICCAI 2025 UNICORN Challenge Pathology vision (Oct 2025)

4th place – Seoul National University Hospital Sleep AI Competition (Dec 2021)

Encouragement Prize – Advanced Course for Medical Information Analysis (Aug 2021)

Grand Prize – University Startup Competition (July 2020)

Grand Prize & Popularity Award – MY Capstone Design Competition (Nov 2020 & July 2020)

Skills

Programming & Data Science

- Python (PyTorch, TensorFlow)
- Docker, Linux

Biomedical & AI Expertise

- *Biomedical AI, Medical Data preprocessing, Medical AI, Computer Vision*
- *Image Generation AI Model (GANs, Diffusion, VAE)*
- *Biomedical Vision Language Model*

Tools & Frameworks

- *Git, Jupyter, Google Cloud, Hugging Face*

Leadership & Activities

Robotics Engineering Department Student Council

- ***President, Robotics Engineering Department Student Council (2019)***
 - *Organized department-wide events and fostered collaboration among students.*
- ***Class Representative, Robotics Engineering (2014 – 2018)***
 - *Acted as a liaison between students and faculty, advocating for student concerns.*