KEEWON SHIN

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OBJECTIVES

I am a passionate AI researcher with a strong background in medical imaging and signal processing.
My goal is to create innovative medical diagnosis solutions based on machine learning that can:
- Reducing the workload of clinicians and enhance the quality of life of patients.
- Overcome the limitations of low-cost medical devices by using AI techniques.

EDUCATION

PhD | **Biomedical Engineering: AI for Medical applications** ***(Advisor: Namkug Kim)*** 2019 – 2023
University of Ulsan, South Korea

MS | **Mechanical Engineering: Noise & Vibration** ***(Advisor: Gunhee Jang)*** 2011 – 2013
Hanyang University, Korea Institute of Science & Technology, South Korea

BS | **Mechanical Engineering** ***(Cum Laude)*** 2004 – 2011
Hanyang University, South Korea

WORK EXPERIENCE

Research professor Jul 2023 – Current
Korea University Anam Hospital
- Responsible for Medical device & Digital healthcare research platform
- Large language model applications in medicine

Postdoctoral fellow Feb 2023 – Jun 2023
Asan Medical Center
- Enhancing the quality of surgery by utilizing biosignals during the operation
- Led a AI team of 5+ employees

AI researcher May 2018 – Jan 2023
University of Ulsan
- Clinical convergence research in various medical imaging modality using machine learning
- Successfully transferred three AI-based technologies to startups

Sound design researcher Feb 2013 – Mar 2018
Hyundai Motor Company
- Development of acoustic/vibration signal processing and control systems
- An expert in tuning Active Engine Sound, Active Noise Canceling & Haptic warning systems
- Sound and vibration quality engineering for high performance and luxury vehicles

Student researcher Feb 2010 – Feb 2013
Korea institute of Science & Technology
- Tribology, controls, signal processing engineering for high-performance actuator and bearings

COMMERCIALIZED PROJECTS

Landmark detection for flatfoot diagnosis on lateral weighted foot x-rays 2023
Technology transferred: **Promedius Inc.**

Enhanced segmentation and quality assessment of Retina vessel using Bayesian U-Net 2022
Technology transferred: **Promedius Inc.**

High-Precision Cerebral Hemorrhage Triage System for Non-Contrast Brain CT 2022
Technology transferred: **Coreline soft.**

PATENT

Method and apparatus for analyzing blood vessel based on machine learning model 2023
Namkug Kim, Keewon Shin, Daewon Kim Korea, PCT

Machine Learning-based CT Image Classification and Segmentation Methodology 2022
Namkug Kim, Sunggu Kyung, Keewon Shin, Gil-sun Hong Korea

Pedestrian protection sound device using air flow 2017
Eunsoo Joo, Taegun Yun, Keewon Shin, Seonghyun Kim, Dongchul Park Korea

Sound recognition technology based on traffic environment 2016
Taegun Yun, Seonghyun Kim, Keewon Shin, Dongchul Park Korea

PUBLICATIONS (BOLD: FIRST AUTHOR, †: CORRESPONDING AUTHOR)

[1] **Shin, Keewon**, H. Kim, W.-Y. Seo, H.-S. Kim, J.-M. Shin, D.-K. Kim, Y.-S. Park, †Kim, Sung-Hoon, and †Kim, Namkug, "Enhancing the performance of premature ventricular contraction detection in unseen datasets through deep learning with denoise and contrast attention module," *Computers in Biology and Medicine*, p. 107532, 2023.

[2] **Hong, Gil-Sun**, **Jang, Miso**, S. Kyung, K. Cho, J. Jeong, G. Y. Lee, Shin, Keewon, K. D. Kim, S. M. Ryu, J. B. Seo, †Lee, Sang Min, and †Kim, Namkug, "Overcoming the challenges in the development and implementation of artificial intelligence in radiology: A comprehensive review of solutions beyond supervised learning," *Korean Journal of Radiology*, vol. 24, 2023.

[3] **Jun Soo Lee**, **Shin, Keewon**, **Ryu, Seung Min**, S. G. Jegal, W. Lee, M. A. Yoon, G.-S. Hong, †Paik, Sanghyun, and †Kim, Namkug, "Screening of adolescent idiopathic scoliosis using generative adversarial network (gan) inversion method in chest radiographs," *Plos one*, vol. 18, no. 5, p. e0285489, 2023.

[4] **Ryu, Seung Min**, **Lee, Soyoung**, M. Jang, J.-M. Koh, S. J. Bae, S. G. Jegal, †Shin, Keewon, and †Kim, Namkug, "Diagnosis of osteoporotic vertebral compression fractures and fracture level detection using multitask learning with u-net in lumbar spine lateral radiographs," *Computational and Structural Biotechnology Journal*, vol. 21, pp. 3452–3458, 2023.

[5] **Park, Hyo Jung**, **Shin, Keewon**, M.-W. You, S.-G. Kyung, S. Y. Kim, S. H. Park, J. H. Byun, †Kim, Namkug, and †Kim, Hyoung Jung, "Deep learning–based detection of solid and cystic pancreatic neoplasms at contrast-enhanced ct," *Radiology*, vol. 306, no. 1, pp. 140–149, 2023.

[6] **Shin, Keewon**, **Lee, Jung Su**, J. Y. Lee, H. Lee, J. Kim, J.-S. Byeon, H.-Y. Jung, †Kim, Do Hoon, and †Kim, Namkug, "An image turing test on realistic gastroscopy images generated by using the progressive growing of generative adversarial networks," *Journal of Digital Imaging*, pp. 1–10, 2023.

[7] **Ryu, Seung Min**, Shin, Keewon, S. W. Shin, S. H. Lee, S. M. Seo, S.-U. Cheon, S.-A. Ryu, M.-J. Kim, H. Kim, C. H. Doh, Y. R. Choi, and †Kim, Namkug, "Automated diagnosis of flatfoot using cascaded convolutional neural network for angle measurements in weight-bearing lateral radiographs," *European Radiology*, pp. 1–11, 2023.

[8] **Kim, Hyojune**, **Shin, Keewon**, H. Kim, E.-s. Lee, S. W. Chung, †Koh, Kyoung Hwan, and †Kim, Namkug, "Can deep learning reduce the time and effort required for manual segmentation in 3d reconstruction of mri in rotator cuff tears?" *Plos one*, vol. 17, no. 10, p. e0274075, 2022.

[9] **Kyung, Sunggu**, Shin, Keewon, H. Jeong, K. D. Kim, J. Park, K. Cho, J. H. Lee, G. Hong, and †Kim, Namkug, "Improved performance and robustness of multi-task representation learning with consistency loss between pretexts for intracranial hemorrhage identification in head ct," *Medical Image Analysis*, vol. 81, p. 102489, 2022.

[10] **Ryu, Seung Min**, **Shin, Keewon**, S. W. Shin, S. H. Lee, S. M. Seo, S.-u. Cheon, S.-A. Ryu, J.-S. Kim, S. Ji, and †Kim, Namkug, "Automated landmark identification for diagnosis of the deformity using a cascade convolutional neural network (flatnet) on weight-bearing lateral radiographs of the foot," *Computers in Biology and Medicine*, vol. 148, p. 105914, 2022.

[11] **Ryu, Seung Min**, **Shin, Keewon**, S. W. Shin, S. Lee, and †Kim, Namkug, "Enhancement of evaluating flatfoot on a weight-bearing lateral radiograph of the foot with u-net based semantic segmentation on the long axis of tarsal and metatarsal bones in an active learning manner," *Computers in Biology and Medicine*, vol. 145, p. 105400, 2022.

[12] **Bae, Hyun-Jin**, H. Hyun, Y. Byeon, Shin, Keewon, Y. Cho, Y. J. Song, S. Yi, S.-U. Kuh, J. S. Yeom, and †Kim, Namkug, "Fully automated 3d segmentation and separation of multiple cervical vertebrae in ct images using a 2d convolutional neural network," *Computer methods and programs in biomedicine*, vol. 184, p. 105119, 2020.

[13] **Choi, Joonmyeong**, Shin, Keewon, J. Jung, H.-J. Bae, D. H. Kim, J.-S. Byeon, and †Kim, Namkug, "Convolutional neural network technology in endoscopic imaging: artificial intelligence for endoscopy," *Clinical endoscopy*, vol. 53, no. 2, pp. 117–126, 2020.

[14] **Kim, Mingyu**, J. Yun, Y. Cho, Shin, Keewon, R. Jang, H.-j. Bae, and †Kim, Namkug, "Deep learning in medical imaging," *Neurospine*, vol. 16, no. 4, p. 657, 2019.

Conference (bold: first author, †: corresponding author)

[1] **Han, Nayeon** and Kim, Minju and Shin, Keewon and Cho, Yongwon and Park, Beom-Jin and †Sung, Deuk Jae, "Advanced Oncologist Assistance: Generating Alarms for new Oncologic Issues based on Radiologic Reports of Serial CT Scans with GPT-4 (Oral)," *RSNA*, 2023

[2] **Shin, Keewon** and Lee, Jiho and Kim, Daewon and †Kim, Namkug, "Deep learning-based quantitative image analysis for detecting coronary artery stenosis, calcification, and vulnerable plaque in coronary CT angiography (Oral)," *AOCR & KCR*, 2022

[3] **Shin, Keewon**, and Lee, Junsoo and Kim, Namkug, "Semi-supervised learning based medical imaging research using generative models (Oral)," *Korean Medical Informatics Society*, 2021

[4] **Shin, Keewon** and Kyung, Sunggu and Hong, Gil-sun and †Kim, Namkug, "Traumatic acute intracranial hemorrhage patient classification and bleeding volume prediction model using Deep Learning (Oral, Award of Excellence)," *KOSAIM*, 2020

[5] **Shin, Keewon** and Kim, Hyo-jun and Kim, Ho-yeon and Ko, Kyung-hwan and †Kim, Namkug, "Utilization of Deep Learning for Automated Reconstruction of 3D MRI in Treatment of Rotator Cuff Tears (Poster)," *ORS*, 2020

[6] **Shin, Keewon** and Jang, Ryung-woo and Ko Kyung-hwan and †Kim, Namkug, "Superresolution Of Bone Slice Thickness At Computed Tomography Usinge Deep Learning Methodology (Poster)," *ORS*, 2020

[7] **Shin, Keewon**, and Hyun, Heejung and Byeon, Younghwa Byeon and Song, Young Ji and †Kim, Namkug, "A semantic segmentation and separation with cascaded 3D U-Net to compare performances of normal controls and patients in cervical spine CT (Oral)," *KCR*, 2019

Honors and Awards

14th (Top 14%) in the Covid Segmentation Grand Challenge 2022
Medical Imaging Grand Challenge 2021

Outstanding Oral Presentation Award 2020
Korea Society of Artificial Intelligence in Medicine

Academic Excellence Scholarship 2019 - 2020
University of Ulsan

43th (Top 1%) of LANL Earthquake Prediction Challenge 2019
Los Alamos National Laboratory, Kaggle Competition

31th (Top 3%) of RSNA Pneumonia Detection Challenge 2019
Radiological Society of North America, Kaggle Competition

Silver Prize in Digital Vehicle Development Competition 2017
Hyundai Motors Company

Next Generation Vehicle Academic Scholarship 2011 - 2012
Hyundai Motors Company

Academic Excellence Scholarship (Cum Laude) 2011
Hanyang University

Silver Prize in Intellectual Property Competition 2010
Korean Intellectual Property Office

National Science and Technology Scholarship 2004, 2008 – 2010
Korea Student Aid Foundation

Excellent Staff Award 2007, 2008
Alticast Co.

Teaching Experience

Machine learning lecturer 2020 – 2022
Korea Human Resource Development Institute for Health and Welfare (KOHI)

Machine learning teaching assistant 2020 – 2021
Korea society of Artificial Intelligence in Medicine

Teaching assistant (Medical imagings, machine learning) 2020 – 2021
University of Ulsan

Academic Service

Reviewer 2023 – Current
International Conference on Medical Image Computing and Computer Assisted Intervention

Reviewer 2023 – Current
Turbomachinery Technical Conference & Exposition, The American Society of Mechanical Engineers

Skills

Languages: Korean (Native), English (Fluent)

Programming: Python, Machine learning (Pytorch, Sklearn, etc.), Swift