Hyunseok Lim

Artificial Intelligence Researcher & MLOps Engineer

Affiliation	Bio Optics and Acoustics Laboratory at Pohang University of Science and Technology
Position	Researcher, Department of Convergence IT Engineering
Address	C^5 77 Cheongam-ro, Nam-gu, Pohang-si, Gyeongsangbuk-do, Rep. of KOREA, 37673
Email	hyunseoki@outlook.kr (Personal), hyunseoki@postech.ac.kr (Business)
Expertise	Project management, Biomedical image segmentation, Video anomaly detection, Container orchestration, Parallel computing
Repositories	GitHub (github.com/loopback-kr), DockerHub (hub.docker.com/u/loopbackkr)
Homepages	Curriculum Vitae (loopback-kr.github.io)

Technical Skills

Programming Languages	Python, C/C++, Javascript/Typescript, SQL
Operating Systems	Ubuntu Server, Windows, Windows Server
Cluster orchestration, Hypervisor Technologies	Docker, Kubernetes, Slurm, WSL, VMware Workstation
Cloud Computing Systems	AWS EC2, AWS Route 53
Machine Learning Frameworks	PyTorch, MONAI Core, Tensorflow
Application Frameworks	Django, FastAPI, Nodejs, Windows API
Web Servers	Nginx, Apache httpd
Development Tools	Git, Visual Studio Code, Visual Studio, 3D Slicer

International Awards

Sep. 18-22, 2022	MICCAI Ischemic Stroke Lesion Segmentation (ISLES) 2022, Hyunsu Jeong, Chiho Yoon, **Hyunseok Lim**, Jongjun Won, Kimin Park Single channel T1-weighted lesion segmentation in acute, sub-acute and chronic stroke (ATLAS challenge): **2nd place** Multimodal MRI infarct segmentation in acute and sub-acute stroke: **4th place**

Published Journal Papers

Published in Apr. 2022	Younghoon Jeon, **Hyunseok Lim**, and Jeonghwan Gwak, "Application and performance analysis of 3D CNN and super-resolution in autoencoder-based anomaly detection system," The Journal of Korean Institute of Next Generation Computing, vol.18, no.2, pp.47-58, 10.23019/kingpc.18.2.202204.005
Published in Apr. 2021	**Hyunseok Lim**, and Jeonghwan Gwak. "Generative Optical Flow Based Abnormal Object Detection Method Using a Spatio-Temporal Translation Network," Journal of the Korea Society of Computer and Information, vol.26, no.4, pp.11-19, 10.9708/JKSCI.2021.26.04.011.
Published in Dec. 2020	Dongwook Min, **Hyunseok Lim**, and Jeonghwan Gwak. "Improved Method of License Plate Detection and Recognition Facilitated by Fast Super-Resolution GAN," Korean Institute of Smart Media, vol.9, no.4, pp.134-143, 10.30693/smj.2020.9.4.134.
Published in Oct. 2020	**Hyunseok Lim**, Hyunsu Jeong, and Jeonghwan Gwak, "A Study of Pneumonia diagnosis using Image Super-resolution based on Residual Dense Networks," The Journal of Korean Institute of Next Generation Computing, vol.16, no.5, pp.15-28, 2020.

Participated Academic Conferences Papers

May 11-13, 2023   Hyunsu Jeong, Chiho Yoon, **Hyunseok Lim**, Jongjun Won, Chulhong Kim, "Deep learning-based ischemic stroke segmentation from brain T1-weighted MR image", Proceedings of the Spring Conference on The Korean Society of Medical & Biological Engineering, pp.396-397, Poster Presentation.

Jan. 13-15, 2022   Huxufeng, **Hyunseok Lim**, and Jeonghwan Gwak, "Mask detection in complex scenes using an ensemble of YOLO models", Proceedings of the Winter Conference on Korea Society of Computer Information, pp.97-98, Oral Presentation.

Jan. 13-15, 2022   **Hyunseok Lim**, Huxufeng, and Jeonghwan Gwak, "Abnormal Behavior Detection and Localization Using Aspect Ratio Based on Mask R-CNN", Proceedings of the Winter Conference on Korea Society of Computer Information, pp.99-101, Oral Presentation.

Jul. 15-17, 2021   Jaeyong Kang, Inki Kim, **Hyunseok Lim**, and Jeonghwan Gwak, "A Crack Detection of Wooden Cultural Assets using EfficientNet Model", Proceedings of the Summer Conference on Korea Society of Computer Information, pp.125-127, Oral Presentation.

Jul. 15-17, 2021   Jaeyong Kang, Inki Kim, **Hyunseok Lim**, and Jeonghwan Gwak, "A Bulge Detection Model in Cultural Asset images using Ensemble of Deep Features", Proceedings of the Summer Conference on Korea Society of Computer Information, pp.129-131, Oral Presentation.

Jul. 15-17, 2021   Jaeyong Kang, Inki Kim, **Hyunseok Lim**, and Jeonghwan Gwak, "An Embedding Similarity-based Deep Learning Model for Detecting Displacement in Cultural Asset Images", Proceedings of the Summer Conference on Korea Society of Computer Information, pp.133-135, Oral Presentation.

Jul. 15-17, 2021   Jaeyong Kang, Inki Kim, **Hyunseok Lim**, and Jeonghwan Gwak, "An Displacement Detection Model in Cultural Asset Images using Object-centric Augmentation", Proceedings of the Summer Conference on Korea Society of Computer Information, pp.137-139, Oral Presentation.

Jul. 15-17, 2021   Jaeyong Kang, Inki Kim, **Hyunseok Lim**, and Jeonghwan Gwak, "An Ensemble Deep Learning Model for Measuring Displacement in Cultural Asset Images", Proceedings of the Summer Conference on Korea Society of Computer Information, pp.141-143, Oral Presentation.

Jul. 15-17, 2021   **Hyunseok Lim**, Inki Kim, Jaeyong Kang, and Jeonghwan Gwak, "Anomaly Detection Performance Improvement Technique through Weight Matrix-based Optical Flow Equalization", Proceedings of the Summer Conference on Korea Society of Computer Information, pp.145-146, Oral Presentation.

Jul. 15-17, 2021   Boemjun Kim, Inki Kim, **Hyunseok Lim**, and Jeonghwan Gwak, "Dataset Augmentation Technique for Crack Detection of Wood Building", Proceedings of the Summer Conference on Korea Society of Computer Information, pp.645-647, Poster Presentation.

Jul. 15-17, 2021   Inki Kim, **Hyunseok Lim**, Beomjun Kim, and Jeonghwan Gwak, "Architectural Cultural Heritage Crack Detection Techniques Using Object Detection", Proceedings of the Summer Conference on Korea Society of Computer Information, pp.649-652, Poster Presentation.

Jul. 15-17, 2021   Mingyu Kim, Huxufeng, Inki Kim, **Hyunseok Lim**, and Jeonghwan Gwak, "An Algorithm for Detecting Deformation of Wooden Buildings using Straight Line Detection", Proceedings of the Summer Conference on Korea Society of Computer Information, pp.653-654, Oral Presentation.

Jun. 20-22, 2021   Thi Kieu Khanh Ho, **Hyunseok Lim**, Jaeyong Kang, Jongin Song, and Jeonghwan Gwak, "A CNN-LSTM Model for Alzheimer's Disease Multi-Class Classification using Multichannel EEG", Proceedings of The 16th Asia Pacific International Conference on Information Science and Technology, pp.23-25, Oral Presentation.

Jun. 20-22, 2021   Thi Kieu Khanh Ho, Zahid Ullah, Inki Kim, **Hyunseok Lim**, Jaeyong Kang, and Jeonghwan Gwak, "Feature Integration for COVID-19 Classification using Chest Radiography", Proceedings of The 16th Asia Pacific International Conference on Information Science and Technology, pp.106-108, Oral Presentation.

Jun. 20-22, 2021   Zahid Ullah, Thi Kieu Khanh Ho, **Hyunseok Lim**, Jaeyong Kang, and Jeonghwan Gwak, "COVID-19 Detection with a Semi-Supervised Adversarial Autoencoder in Chest Radiographs", Proceedings of The 16th Asia Pacific International Conference on Information Science and Technology, pp.109-111, Oral Presentation.

May 13-15, 2021   Jaeyong Kang, **Hyunseok Lim**, Huxufeng, and Jeonghwan Gwak, "Embedding Similarity-based Crowd Anomaly Detection using Object Centric Augmentation", Proceedings of the Spring Conference on Korean Institute of Next Generation Computing, pp.109-112, Poster Presentation.

May 13-15, 2021   **Hyunseok Lim**, Inki Kim, Jaeyong Kang, and Jeonghwan Gwak, "Performance Comparison of Using SSIM Loss Function in a GAN-based Anomaly Detection System", Proceedings of the Spring Conference on Korean Institute of Next Generation Computing, pp.371-374, Poster Presentation.

May 13-15, 2021	Jaeyong Kang, **Hyunseok Lim**, Mingyu Kim, Zahid Ullah, and Jeonghwan Gwak, "Effective Data Preprocessing for a Reconstruction model-based Anomaly Detection", Proceedings of the Spring Conference on Korean Institute of Next Generation Computing, pp.375-377, Poster Presentation.
May 13-15, 2021	Inki Kim, **Hyunseok Lim**, Thi Kieu Khanh Ho, Jaeyong Kang, and Jeonghwan Gwak, "Imbalanced Dataset training techniques with Hard negative mining and Sample Selection", Proceedings of the Spring Conference on Korean Institute of Next Generation Computing, pp.391-394, Poster Presentation.
May 13-15, 2021	Dongwook Min, **Hyunseok Lim**, Thi Kieu Khanh Ho, Jaeyong Kang, and Jeonghwan Gwak, "Cough Detection System using EfficientNet", Proceedings of the Spring Conference on Korean Institute of Next Generation Computing, pp.395-397, Poster Presentation.
May 13-15, 2021	Jaeyong Kang, **Hyunseok Lim**, Dongwook Min, Zahid Ullah, and Jeonghwan Gwak, "Anomaly Detection System using a ResUNet++ based Image Inpainting Method", Proceedings of the Spring Conference on Korean Institute of Next Generation Computing, pp.401-403, Poster Presentation.
May 22-23, 2020	Hyunwook Kim, **Hyunseok Lim**, Hyunsu Jeong, and Jeonghwan Gwak, "Comparative Study on the Effects of Deep Learning-based Vehicle Detection Models for Improving ALPR Performance", Proceedings of the Spring Conference on Korean Institute of Smart Media, Oral Presentation.
May 22-23, 2020	**Hyunseok Lim**, Sangwon Pak, and Jeonghwan Gwak, "Abnormal Object Detection and Localization by Utilizing Optical Flow and Instance Segmentation", Proceedings of the Spring Conference on Korean Institute of Smart Media, Oral Presentation.
May 22-23, 2020	Sangwon Pak, **Hyunseok Lim**, and Jeonghwan Gwak, "Robust Face Segmentation Model by Combining Multi-Task Cascaded CNN and Global Convolutional Network", Proceedings of the Spring Conference on Korean Institute of Smart Media, Poster Presentation.
May 22-23, 2020	Dongwook Min, **Hyunseok Lim**, Gwang Lee, Bonggeun Kim, and Jeonghwan Gwak, "Research of License Plate Detection and Recognition with Fast-Super Resolution GAN", Proceedings of the Spring Conference on Korean Institute of Smart Media, Oral Presentation.
May 22-23, 2020	Jooho Lee, Sangwon Pak, **Hyunseok Lim**, Gwang Lee, Bonggeun Kim, and Jeonghwan Gwak, "Comparative Study of Deep Learning-based Face Segmentation Methods for Intelligent Privacy Masking", Proceedings of the Spring Conference on Korean Institute of Smart Media, Poster Presentation.

Research Project Participation Experience

Apr. 2023 ~ Oct. 2023

Project title	SK Hynix AICC (POSTECH)
Role	Researcher

Oct. 2021 ~ Mar. 2022

Project title	Image-based abnormal behavior analysis and detection technology development ProjectLab
Grant No.	2021RIS0576
Role	Technology development researcher
Responsibilities	Development of anomaly detection method, Data preprocessing
Achievements	Participation in Capstone Design Contest
	Published 1 KCI paper
	Presented 6 papers at conferences
	Applied 1 patents
	1 technology transfer
	Awarded at the conference

Dec. 2021 ~ Apr. 2022

Project title	Development of artificial intelligence-based spinal sagittal analysis and deformation alignment diagnosis program
Grant No.	2021RIS0860
Role	Participating researcher
Responsibilities	Building datasets, Interface development
Achievements	Published 1 SCIE paper

Applied 1 patent

Dec. 2021 ~ Apr. 2022

Project title	Development of an intelligent IoT-based behavior monitoring system to fill the gap of health and medical personnel in the nursing environment
Grant No.	2022D0701011
Role	Participating researcher
Responsibilities	Core technology development, Dataset building and preprocessing, Performance presentation
Achievements	Published 4 SCIE papers
	Published 1 KCI paper
	Applied 5 patents
	Registrated 12 software programs
	Awarded at Research achievement presentation

Oct. 2021 ~ Mar. 2022

Project title	Biometric information-based user identification system development ProjectLab
Grant No.	2021RIS0791
Role	Participating researcher
Responsibilities	Building datasets
Achievements	Participation in Capstone Design Contest
	Published 1 KCI paper
	Applied 1 patent

Jan. 2021 ~ May 2021

Project title	Development of ensemble deep learning technology and platform for smart insole-based gait disorder screening
Grant No.	2021RIS0039
Role	Participating researcher
Responsibilities	IoT Equipment production, Testdata collection & preprocessing, IRB application, API development, Development of pattern detection algorithm
Achievements	Published 5 SCIE papers
	Published 2 KCI papers
	Presented 6 papers at conferences
	Applied 3 patents
	1 technology transfer
	3 prototypes released
	Awarded at the conference

Dec. 2020 ~ May 2021

Project title	Deep Medical Intelligence: Practical Talent Nurturing ProjectLab for Artificial Intelligence Analysis of Medical Data
Grant No.	2020RIS0334
Role	Participating researcher
Responsibilities	Testdata collection and preprocessing, Development teaching
Achievements	Participation in Capstone Design Contest
	Published 2 SCIE papers
	Published 3 KCI papers

Work Experience

Jul. 2019 ~ Aug. 2022	**Artificial Machine Intelligence Lab** at Korea National University of Transportation
Jan. 2021 ~ May 2021	Technology Development Researcher in 3LHealthcare Co., Ltd
	Gait data collection, gait pattern analysis, pattern detection modeling

Patents

May 27, 2021   **Hyunseok Lim**, Jeonghwan Gwak, "APPARATUS AND METHOD FOR DETECTING OBJECT OF ABNORMAL BEHAVIOR", KR Patent, Application No. 1020210069658, Registration No. 1023478110000

Awards & Honors

Apr. 15, 2022   Outstanding Project Award, Chungbuk Bio-Health Industry Innovation Research Performance Presentation

Jun. 22, 2021   Outstanding Paper Award granted by APIC-IST

May 14, 2021   Best Paper Award granted by Korean Institute of Next Generation Computing

Nov. 21, 2020   Road Environment Panoramic Image AI Data - 2020 Online Hackaton for AI Training, Gold Award granted by National Information Society Agency

May 23, 2020   Outstanding Oral Presentation Award granted by Korean Institute of Smart Media

Professional Certificates

2023 ~ 2026   AWS Certified Solutions Architect - Associate (SAA-C03)

Software Registration to Korea Copyright Commission

May 27, 2021   **Hyunseok Lim**, Jeonghwan Gwak, "Abnormal Behavior Detection System through Motion Pattern Learning using GAN", C-2021-021720

Education

Mar. 2020 ~ Aug. 2022   **Master's degree** in Artificial intelligence of Software engineering, Korea National University of Transportation

Mar. 2013 ~ Feb. 2020   **Bachelor's degree** of Software engineering, Korea National University of Transportation

Technical Reviews for International Journals

Jun., Aug. 2020   PLOS ONE

Military Service

May 2016 ~ Nov. 2016   Staff Sergeant, Army in Rep. of Korea

Aug. 2014 ~ May 2016   Sergeant, Army in Rep. of Korea

Additional Experience

Jul. 14, 2023   2023 POSCO Group AI Expert Training Course (9th Class) Training Assistant

2019   LIKE LION at Korea National University of Transportation 7th Executive staff

Dec. 2018   2018 Public ICT Alliance Clinic Camp - eGov Framework Understanding and Practice

Nov. 2018   2018 Open Source Software Experience Camp

References

Ph.D., Professor **Jeonghwan Gwak**

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Sincerely Yours,
Hyunseok Lim