

SEUNGBO SHIM

Ph.D. | Senior Researcher, Korea Institute of Civil Engineering and Building Technology (KICT)
seungboshim@kic.re.kr | +82-31-910-0395 | [Google Scholar](#) | Department of Geotechnical Research Engineering

RESEARCH INTERESTS

AI-based infrastructure health monitoring · Deep learning for visual inspection · Generative AI for data augmentation · Smart construction automation · Autonomous inspection robots · Digital twin for civil infrastructure

EDUCATION

Korea Advanced Institute of Science and Technology (KAIST) Mar. 2020 – Aug. 2022

Ph.D. in Civil and Environmental Engineering (Geotechnical Engineering)
Dissertation: A Study on the Deep Learning-based Concrete Surface Crack Detection and Measurement Automation System
Completed in 2.5 years while concurrently employed at KICT

Pohang University of Science and Technology (POSTECH) Mar. 2009 – Feb. 2011

M.S. in Electrical and Computer Engineering
Thesis: Slab Numbers Localization for Automation Using Optical Flow Estimation in Video

Pusan National University Mar. 2002 – Feb. 2009

B.E. in Electrical and Computer Engineering

PROFESSIONAL EXPERIENCE

Korea Institute of Civil Engineering and Building Technology (KICT) Jan. 2017 – Present

Senior Researcher | Department of Geotechnical Research Engineering

- Research and development of deep learning-based construction automation systems
- Development of AI-powered tunnel and infrastructure crack inspection robots
- Focused on generative AI (diffusion model, GAN) applications for structural health monitoring
- PI for 2 technology transfers (KRW 30M total) and holder of 8 registered patents
- Committee member, Korean Tunnelling and Underground Space Association – Smart Tunnel Technology Committee (Jul. 2022 – present)
- Peer reviewer for IEEE TIM, IEEE TITS, Automation in Construction, EAAI, Measurement (all Q1)

Samsung Heavy Industries Co., Ltd. Dec. 2010 – Jan. 2017

Research Engineer | Marine Engineering Technology Research Division

- Research and development of vision-based automation systems for offshore engineering
- Recipient of Samsung Heavy Industries 'Proud Employee Award' (2012)

INTERNATIONAL JOURNAL PUBLICATIONS (SCI/SCIE)

10 papers as first / sole / corresponding author (all Q1 journals). 19 total SCI/SCIE publications.

#	Role	Year	Title	Journal	Authors	IF	Rank
1	1st/Cor.	In press	3D Model-Based Reinforcement Bar Spacing Measurement Using Self-Supervised Blind Super-Resolution and Ultra-Wideband Localization	Computer-Aided Civil & Infrastructure Engineering	4	IF 8.5	Q1 (2/182)
2	Sole	2025.05	Self-supervised domain adaptive approach for extrapolated crack segmentation with fine-tuned inpainting generative model	Computer-Aided Civil & Infrastructure Engineering	1	IF 8.5	Q1 (2/182)
3	Sole	2025.04	Segmentation for Crack Detection via Generative Knowledge Distillation	Automation in Construction	1	IF 9.6	Q1 (1/182)
4	Sole	2024.04	Self-training approach for crack detection using synthesized crack image with conditional generative adversarial network	Computer-Aided Civil & Infrastructure Engineering	1	IF 8.5	Q1 (2/182)
5	1st	2023.02	Remote robotic system for 3D measurement of concrete damage in tunnel with ground vehicle and manipulator	Computer-Aided Civil & Infrastructure Engineering	5	IF 9.6	Q1 (1/182)
6	1st	2022.05	Stereo-vision-based 3D concrete crack detection using adversarial learning with balanced ensemble discriminator	Structural Health Monitoring	4	IF 5.7	Q1

			networks				
7	1st	2022.01	Road damage detection using super-resolution and semi-supervised learning with generative adversarial network	Automation in Construction	1	IF 9.6	Q1 (1/182)
8	1st	2021.08	Road surface damage detection based on hierarchical architecture using lightweight auto-encoder network	Automation in Construction	1	IF 9.6	Q1 (1/182)
9	1st	2020.09	Multiscale and adversarial learning-based semi-supervised semantic segmentation approach for crack detection in concrete structures	IEEE Access	4	IF 3.9	Q1
10	1st	2020.05	Lightweight semantic segmentation for road-surface damage recognition based on multiscale learning	IEEE Access	2	IF 3.9	Q1
11	Co-author	2026.03	Deep learning-based segmentation framework to decouple matrix deformation and crack evolution in shales using X-ray computed tomography	International Journal of Rock Mechanics and Mining Sciences	4	IF 7.5	Q1 (3/65)
12	Co-author	2026.01	Deep Reinforcement Learning for Temperature Control of a Two-Way SMA-Actuated Tendon-Driven Gripper	Actuators	7	IF 2.3	
13	Co-author	2024.08	Evaluation of Leakage Due to Submerged Floating Tunnel Crack and Its Propagation Characteristics	KSCE Journal of Civil Engineering	4	IF 2.2	
14	Co-author	2024.06	Anomaly detection via improvement of GPR image quality using ensemble restoration networks	Automation in Construction	4	IF 10.3	Q1 (2/139)
15	Co-author	2023.04	Learning structure for concrete crack detection using robust super-resolution with generative adversarial network	Structural Control & Health Monitoring	4	IF 5.4	Q1 (20/139)
16	Co-author	2022.03	Analysis of Stability and Required Offset with Vibration Velocity Considering Conditions of Bedrock and Explosive Charges Using TBM and NATM Extension Blasting Method	Applied Sciences	6	IF 2.7	
17	Co-author	2022.03	Efficiency Analysis of Filter-Based Calibration Technique to Improve Tunnel Measurement Reliability	KSCE Journal of Civil Engineering	5	IF 2.2	
18	Co-author	2021.03	Lightweight pixel-wise segmentation for efficient concrete crack detection using hierarchical convolutional neural network	Smart Materials and Structures	4	IF 4.1	Q1
19	Co-author	2021.02	Stability Evaluation of TBM Pilot Tunnels to Rear Blasting Using the Protection Shield	Applied Sciences	6	IF 2.7	

DOMESTIC JOURNAL PUBLICATIONS (KCI)

23 papers published in Korean peer-reviewed journals (primarily as 1st / corresponding author), covering topics including generative AI for crack detection, road surface damage recognition, and data augmentation for infrastructure inspection.

PATENTS (KOREA, PRIMARY INVENTOR)

Registration No.	Date	Title (Primary Inventor)
10-2742025	2024.12	Self-training system for crack detection using virtual crack image generation
10-2586815	2023.10	Structural crack measurement system, method, and computer-readable recording medium
10-2512016	2023.03	Concrete damage detection system, method, and computer-readable recording medium
10-2487554	2023.01	Damage detection system for underground utility tunnels using autonomous vehicles and manipulators
10-2423218	2022.07	Simultaneous road surface damage and obstacle detection system using deep neural networks
10-2311558	2021.10	AI-based structural damage detection system, method, and computer-readable recording medium
10-2153486	2020.09	Multi-AVM camera system for measuring positions of construction machinery and workers
10-2106452	2020.04	AVM camera-based high-speed tunnel interior measurement system and method

TECHNOLOGY TRANSFER

Generative AI-Based Site-Adaptive Concrete Crack Detection Technology	Nov. 2024
Principal Investigator Contract type: Non-exclusive license KRW 20M + 2% royalty	
Self-Supervised Learning-Based Damage (Crack) Detection Technology Using Generative AI	Jun. 2025
Principal Investigator Contract type: Non-exclusive license KRW 10M + 2% royalty	

HONORS & AWARDS

- Proud Employee Award, Samsung Heavy Industries – Dec. 2012
- Outstanding Emerging Researcher Award (Research Innovation), National Research Council of Science & Technology Chairman Award – Jun. 2022
- Outstanding Research Paper Award, Korea Institute of Civil Engineering and Building Technology President Award – Dec. 2023
- Excellence Award, 2024 Public Institution Data Analysis & Utilization Competition, National Information Society Agency – Nov. 2024
- Outstanding Problem Discovery Award, 2025 DATA-AI Analysis Competition, Korea Institute of Science and Technology Information – Dec. 2025

MEDIA COVERAGE (SELECTED)

- Research featured in 35+ domestic and international media outlets, including:
- YTN News: 'AI Robot Detects Micro-Cracks Inside Tunnels' (Dec. 28, 2021)
 - Arirang TV: 'Tunnel Crack Detection Robot' (Jan. 26, 2022)
 - NST International: 'Generative AI Drones Guard Aging Tunnels, Enhancing Safety & Efficiency' (Mar. 10, 2025)
 - Chosun Ilbo, Donga Science, ZDNet Korea, and 30+ additional outlets covering AI inspection drone technology (Jan. 2025)

TEACHING & ACADEMIC OUTREACH

- Invited lecture, KICT–KRRRI Technology Exchange Seminar: 'Tunnel Defect Detection Robot Using Semi-Supervised Deep Learning' (Jun. 2022)
- Invited lectures, Kumoh National Institute of Technology (Dept. of Electronic Engineering) and Incheon National University – AI-based crack detection automation systems (Jan. 2024)
- Invited lecture, KAIST (Civil & Environmental Engineering): 'Generative AI-Based Structural Health Assessment Technology for Underground Spaces' (Mar. 2025)

PEER REVIEW SERVICE

- IEEE Transactions on Instrumentation and Measurement (Q1)
- IEEE Transactions on Intelligent Transportation Systems (Q1)
- Engineering Applications of Artificial Intelligence – Elsevier (Q1)
- Measurement – Elsevier (Q1)
- Automation in Construction – Elsevier (Q1)
- External examiner, KAIST Doctoral Dissertation (Department of Civil & Environmental Engineering)
- External examiner, Incheon National University Doctoral Dissertation (Department of Mechanical Engineering)

TECHNICAL SKILLS & LANGUAGES

- Programming: Python (PyTorch, TensorFlow, OpenCV), MATLAB, C++
- AI/ML: CNNs, GANs, Diffusion Models, Semi-supervised Learning, Self-supervised Learning, Detection & Segmentation