

DONGYOUN KIM

Ph.D. Candidate • Computer Science

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Research & Teaching Summary

My research focuses on vision–language representation learning and its extension to vision–language–action systems, with an emphasis on complex scene understanding using a model distillation framework. My work also includes developing computer vision sensing systems using multi-camera setups, spanning hardware platforms to software deployment, and applying machine learning methods across interdisciplinary domains. I have over eight years of teaching experience across a broad range of computer science courses, from core computing to artificial intelligence and machine learning.

EDUCATION

South Dakota State University | Brookings, SD

May 2024 – July 2026

Doctor of Philosophy in Computer Science

GPA: 3.8

- Advisor: Dr. Kwanghee Won
- Dissertation: “Task-Aligned Knowledge Transfer for Vision-Language Models across Diverse Visual Challenges”

Iowa State University | Ames, IA

Aug 2019 – May 2024

Master of Science in Artificial Intelligence

GPA: 3.7

- Advisor: Dr. Simanta Mitra
- Project: “Intelligent Table Transcriber: AI-driven Table Recognition Framework for Enhanced Information Retrieval”

South Dakota State University | Brookings, SD

Aug 2016 – Aug 2019

Master of Science in Computer Science

GPA: 3.75

- Advisor: Dr. Sung Shin
- Thesis: “Development of a semantic scene conversion model for image-based localization at night”

Kookmin University | Seoul, South Korea

Mar 2009 – Feb 2013

Bachelor of Engineering in Electronic Engineering

GPA: 2.55

RESEARCH EXPERIENCE

Intelligent Vision Systems Laboratory | South Dakota State University

May 2024 – Present

Advisor: Dr. Kwanghee Won

Computer Vision Measurements for Bridge Field Testing

- PI: Dr. Mostafa Tazarv (PI, University of Nevada, Reno), Dr. Kwanghee Won (South Dakota State University), Dr. Marco Ciarcia (Colorado State University)
- Led the development of a real time image processing system for bridge field testing, including a ground-based DIC (Digital Image Correlation) system, achieving sub-millimeter displacement accuracy.

Vision–Language Model Distillation for Region Representation Learning

- Proposed an asymmetric soft-contrastive objective for region-level distillation in vision-language models under heterogeneous text supervision.
- Evaluated region-level representation frameworks across varying model complexities and scene characteristics.

Visual Structured data (Table and Chart) understanding in Scientific Document

- Explored approaches to process visual table data in scientific papers for enhancing extractive question answering
- Designed rationale-aware knowledge distillation framework for table and chart question answering.
- Built teacher–student pipelines with multi-rationale supervision.

Artificial Intelligence with Wearable Sensors for Health Monitoring

- Surveyed deep learning methods across wearable multiple sensing modalities for stress, cardiovascular, and activity monitoring, identifying design implications for next-generation wearable systems.

Multi-Camera Acquisition and Processing Systems

- Implemented a monitoring framework using multiple Raspberry Pi clients and server-based coordination.
- Designed real time image collection pipelines from vehicle-mounted cameras, including stitching and synchronization.

M.S. in Artificial Intelligence | Iowa State University

Nov 2019 – May 2024

Design and Implementation of an Interactive Platform

- Advisor: Dr. Jeong-eun Lee
- Collected and processed aging-related COVID-19 data through web crawling and data engineering.
- Designed and developed an interactive web-based platform (Front-end) for the ACT Program.
- Collaborated with the Department of Human Development and Family Science on interdisciplinary research.

Concrete Strength Prediction using Deep Learning techniques

- Applied machine learning techniques to predict compressive strength from raw sensor data in concrete materials.
- Collaborated with the Department of Civil Engineering at Hanyang University, South Korea.

Weakly-supervised Semantic Segmentation on Historical Document Images

- Co-developed a Gravity-map-based pseudo-labeling technique for historical page segmentation.

Convergent Computing Technology Lab | South Dakota State University

Aug 2016 – Aug 2019

Advisor: Dr. Sung Shin and Dr. Kwanghee Won

Image-Based Localization at Night using Deep Learning

- Led the development of a semantic image translation pipeline for nighttime visual localization.
- Collected and annotated a custom dataset of 14,000 stereo image pairs from a mobile ground vehicle.

Medical Image Segmentation with MRI Data

- Developed a 3D knee segmentation pipeline with inhomogeneity correction on 2D MRI scans.
- Addressed intensity non-uniformity and performed volume validation across multi-patient datasets.
- Collaborated with the Electronics and Telecommunications Research Institute (ETRI), South Korea.

Wireless Body Area Network (WBAN) in space

- Built a wireless health monitoring system using flexible sensors, Arduino, and Bluetooth.
- Collaborated with NASA and the University of South Dakota on physiological sensing under space conditions.

Agricultural Image Analysis using SVM and Multispectral Imaging

- Classified white mold in soybean fields using multispectral imagery and vegetation indices.

PUBLICATIONS

Published

- **Dongyoun Kim***, Syed Saad Ahmed*, Amirhossein Amjad, Kwanghee Won, and Xiaojun Xian. "Integrating Artificial Intelligence with Wearable Sensors for Advanced Health Monitoring and Diagnosis." *Biosensors*, 16(6), Article 344, 2026.
- Jingong Chen, **Dongyoun Kim**, Chulwoo Pack, Jun Huang, and Kwanghee Won. "TIU-ReID: Target Identity Unlearning for Person Re-Identification." In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 8506–8515. 2026.
- **Dongyoun Kim***, Wonseok Heo*, Jee-Hyong Lee, and Kwanghee Won. "Structure- and Semantic-based Rationale Distillation: Table and Chart Question Answering in Scientific Documents." In *Proceedings of the International Conference on Research in Adaptive and Convergent Systems (RACS '25)*, Article 39, 1–4. 2025.
- **[Travel Award] Dongyoun Kim**, Hyung-do Choi, Youngsun Jang, and John Kim. "Extracting Information from Scientific Literature via Visual Table Question Answering Models." In *Proceedings of the International Conference on Research in Adaptive and Convergent Systems*, pp. 192-198. 2024.
- Jang, Youngsun*, **Dongyoun Kim***, Chulwoo Pack, and Kwanghee Won. "A Novel Dataset for Flood Detection Robust to Seasonal Changes in Satellite Imagery." In *Proceedings of the International Conference on Research in Adaptive and Convergent Systems*, pp. 177-184. 2024.
- Hasan Mirzakhani-nafchi, Chulwoo Pack, **Dongyoun Kim**, Young Chang, Kwanghee Won. "Comparative Analysis of Deep Learning-based Anomaly Detection Models for GPS Spoofing Detection." In *Proc. of the ACM Int'l Conf. on Research in Adaptive and Convergent Systems (RACS '24)*, November 5–8, 2024, Pompei, Italy. ACM.
- Chulwoo Pack, **Dongyoun Kim**. "Weakly-supervised Semantic Segmentation on Historical Document Images." In *Proc. of the ACM Int'l Conf. on Research in Adaptive and Convergent Systems (RACS '23)*, August 6–10, 2023, Gdansk, Poland. ACM.
- Choi, Ju-Hee, **Dongyoun Kim**, Min-Sam Ko, Dong-Eun Lee, Kwangwoo Wi, and Han-Seung Lee. "Compressive strength prediction of ternary-blended concrete using deep neural network with tuned hyperparameters." *Journal of Building Engineering*, 2023: 107004.
- Subrahmanyam Vaddi, **Dongyoun Kim**, Chandan Kumar, Shafqat Shad, and Ali Jannesari. "Efficient Object Detection Model for Real-time UAV Application." *Computer and Information Science*, 14(1), 1–45, February 2021.
- **Dongyoun Kim**, Sangwon Shin, Jinwoo Park, and Sung Shin. "Development of a Semantic Scene Conversion Model for Image-based Localization at Night." In *Proc. of the Int'l Conf. on ACM RACs*, Chongqing, China, 2019.
- **Dongyoun Kim**, Ji Young Lee, Joon Shik Yoon, Kwang Jae Lee, and Kwanghee Won. "Development of Automated 3D Knee Bone Segmentation with Inhomogeneity Correction for Deformable Approach in MRI." In *Proc. of the Int'l Conf. on ACM RACs*, Honolulu, Hawaii, 2018.
- Ji Young Lee, **Dongyoun Kim**, Jin Yeong Mun, Seok Kang, Seong Ho Son, and Sung Shin. "Texture Weighted Fuzzy C-Means Algorithm for 3D Brain MRI Segmentation." In *Proc. of the Int'l Conf. on ACM RACs*, Honolulu, Hawaii, 2018.
- Sae-han Suh, **Dongyoun Kim**, Ji-eun Jhang, Emmanuel Byamukama, Gary Hatfield, and Sung-Y. Shin. "Identification of the White-Mold Affected Soybean Fields Using Multispectral Imageries, Spatial Autocorrelation and SVM." In *Proc. of the Int'l Conf. on ACM RACs*, pp. 104–109, 2017.
- Jin Yeong Mun, Ji Young Lee, **Dongyoun Kim**, and Sung Shin. "Extract Texture-Problemtic Femur from Knee MRI using Fuzzy C-Means and Region Growing Approach." In *International Conference on Internet (ICONI)*, 2017.

Workshop papers (non-archival)

- **Dongyoun Kim** and Kwanghee Won. "Explicit Token-Based Adapters for Frozen Vision-Language-Action Models." *CVPR 2026 Workshop on 3D-LLM-VLA*, Jun 2026.

- Viraj Samson, **Dongyoun Kim**, Jingong Chen, Chulwoo Pack, Dongfeng Fang, and Kwanghee Won. "A Taxonomy-Driven Modular Defense against Non-Canonical Language in Vision-Language-Action Models." CVPR 2026 Workshop on 3D-LLM-VLA, Jun 2026.

TEACHING EXPERIENCE

GRADUATE INSTRUCTOR

Jan 2026 – May 2026

Department of Electrical Engineering and Computer Science, **South Dakota State University**

SE 306: Software Project Management and Testing [2026 Spring]

- Instructor of record for a core undergraduate course on software project management and testing.
- Designed and delivered lectures on software delivery models (V-model, Agile, and DevOps) and software testing.
- Supervised semester-long team projects, including requirements analysis, milestone tracking, and quality assurance.

CSC 292: Python program data science [2025 Fall] | mid-semester appointment

Oct 2025 – Dec 2025

- Delivered lectures covering fundamental concepts of Python programming and data science applications.
- Developed lecture materials, coding examples, and visual aids to support classroom instruction.
- Designed and graded assignments, quizzes, and exams to evaluate student learning outcomes.

GRADUATE TEACHING ASSISTANT

Aug 2019 – Dec 2023

Department of Computer Science, **Iowa State University**

Com S 472/572: Principles of Artificial Intelligence [2022 Spring, 2022 Fall, 2023 Spring, 2023 Fall]

- Facilitated weekly recitation sessions to deepen student understanding of core AI topics, including heuristic search, logic-based reasoning, and planning algorithms.
- Assisted 100+ students by managing and grading multi-language programming projects and exams, proctoring midterm and final examinations with integrity, and providing academic support through office hours.

Com S 474/574: Machine Learning [2023 Spring]

- Evaluated hands-on assignments and coding projects covering supervised learning, model evaluation, and neural networks.

Com S 113: Introduction to Spreadsheets and Databases [2019 Fall, 2020 Spring, 2020 Fall, 2021 Spring, 2021 Fall]

- Led and managed four weekly lab sessions for classes of 45+ students each, delivering hands-on instruction in spreadsheet functions and foundational database concepts using Microsoft Excel and Access.
- Managed the grading of 100+ weekly lab assignments and all course examinations, ensuring consistency, accuracy, and timely feedback.
- Coordinated lab logistics, including setup, technical troubleshooting, and alignment of grading standards with fellow TAs.

GRADUATE TEACHING ASSISTANT

Jan 2017 – May 2018

Department of Electrical Engineering and Computer Science, **South Dakota State University**

CSC 710, CSC 770: Programming Languages & Software Engineering

- Supported software engineering project teams by providing feedback on design patterns and documentation.
- Evaluated coding assignments and led office hours for debugging and design clarification.

AWARDS & HONORS

- **Gold Reviewer (Top Reviewer Recognition)**, ICML 2026 | Seoul, South Korea Jul 2026
- **Student Travel Award**, ACM RACS Conference | Pompei, Italy Nov 2024

- **Outstanding Activity Award**, Iowa Korean Association | Ames, IA Dec 2023
- **2018 UPE Academic Achievement Awards-Scholarship**, Upsilon Pi Epsilon Aug 2018
International honor society in the Computing and Information disciplines | Brookings, SD

MENTORING

Undergraduate Students

- Senior Design project on multi-user VR system for education Aug 2025 – May 2026
- Parth Shailesh Patel, Undergraduate Research Assistant, South Dakota State University May 2025 – Aug 2025

SERVICE AND OUTREACH & PROFESSIONAL DEVELOPMENT

Service and Outreach

- **Exhibitor**, BIG (Believe in Girls) STEM Outreach Event – Girl Scouts Dakota Horizons Oct 4, 2025
Department of Computer Science, SDSU
- **Volunteer**, North Central North America High School Programming Contest Apr 27, 2024
Department of Computer Science, Iowa State University
- **Volunteer**, SDSU Program Design Competition Mar 23, 2019
Department of Computer Science, SDSU
- **President**, Upsilon Pi Epsilon (UPE) Aug 2018 – Aug 2019
National Computer Science Honor Society, SDSU Chapter

Development

- Computer Science Graduate TA Training by Dr. Chang, Iowa State University Aug 2022, Aug 2023
- **Participant**, Midwest Big Data Summer School, Ames, IA May 16 – 19, 2022
- Understanding FERPA, Office of the Registrar Aug 2019 – Aug 2022

REFERENCE

Dr. Kwanghee Won, Associate Professor of Computer Science, South Dakota State University

Email: Kwanghee.Won@sdstate.edu | Phone: 605-688-4346

Dr. Mostafa Tazarv, Associate Professor of Civil and Environmental Engineering, University of Nevada, Reno.

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Dr. Sung Shin, Professor Emeritus of Computer Science, South Dakota State University

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