Jiho Park

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Education

Dongguk University *Seoul, South Korea*
Master of Engineering in Artificial Intelligence *Sept. 2022 – Aug. 2024*
- GPA: 4.5/4.5
- Advised by Dr. Jihie Kim

Dongguk University *Seoul, South Korea*
Bachelor of Science in Computer Science and Engineering *Mar. 2017 – Aug. 2022*
- GPA: 4.0/4.5 (Graduated with honors, 95.0%)

Research Interest

Computer Vision, Vision-Language Alignment, Multi-modal Learning, Text-to-Image Generation, Image Editing

Experience

University of Toronto *Toronto, Canada*
Visiting Research Student, Dept. of Mechanical & Industrial Engineering *Jan. 2024 – June 2024*
- Courses: Introduction to Deep Learning, Data Science Methods & Statistical Learning, and Data Analytics
- Participated in an industry-partnered project that involved developing deep learning-based human detection packages for CPU usage efficiency with a robotics company, Cyberworks Robotics.

Dongguk University *Seoul, South Korea*
Research Assistant *Sept. 2023 – Dec. 2023*
- Collaboration with Intelligent Robotics Laboratory, University of Birmingham
- Participated in a project, 3D Hand-Object reconstruction, and compositional action using collaborative learning and superquadrics.

University of Birmingham *Birmingham, UK*
Visiting Research Student, Dept. of Computer Science *Sept. 2022 – Feb. 2023*
- Studied Hand-Object Interaction: Grasping and Motion Synthesis.
- Participated in a project, Dexterous hand-object grasp control with a prosthetic hand.

Purdue University *West Lafayette, US*
Visiting Scholar, Dept. of Computer and Information Technology *Oct. 2021 – Dec. 2021*
- Participated in an IoT-based smart farm project with students at Purdue University.

Teaching

Teaching Assistant *Dongguk University*
- Introduction to Deep Learning [2024.09 - 2024.12]
- Introduction to Artificial Intelligence [2023.09 - 2023.12]
- Data Structure (C++) [2022.03 - 2022.06]
- Data Structure (C++) [2019.03 - 2019.06]

Publications

Collaborative Learning for 3D Hand-Object Reconstruction and Compositional Action Recognition from Egocentric RGB Videos using Superquadrics
Tze Ho Elden Tse, Runyang Feng, Linfang Zheng, ***Jiho Park***, Yixing Gao, Jihie Kim, Ales Leonardis, Hyung Jin Chang
Accepted at The 39th Annual AAAI Conference on Artificial Intelligence (AAAI2025)

Simulating Mobile Robot Vision: An Analysis of RGB-D versus RGB-Based Distance Accuracy and CPU Optimization
Minseok Kong*, ***Jiho Park***, Daye Lee*, Nikolaos Kourtzanidis, Jungmin So
Accepted at The 7th International Conference on Artificial Intelligence in Information and Communication (ICAIIC 2025)

DGU-HAO: A Dataset With Daily Life Objects for Comprehensive 3D Human Action Analysis
Jiho Park, Junghye Kim, Yujung Gil, Dongho Kim
Published: 09 Jan 2024, DOI: 10.1109/ACCESS.2024.3351888

DGU-HAU: A Dataset for 3D Human Action Analysis on Utterances
Jiho Park, Kwangryeol Park*, Dongho Kim
Published: 27 Nov 2023, DOI: 10.3390/electronics12234793

Dexterous Hand-Object Grasp Control with Prosthetic Hand
Sanghun Kim*, ***Jiho Park***, Zhongqun Zhang, Jihie Kim, Hyung Jin Chang, Hyeryung Jang
In proceeding of The 20th World Congress of the International Fuzzy Systems Association (IFSA 2023)

Deep Learning-Based Approaches for Classifying Foraminal Stenosis Using Cervical Spine Radiographs
Jiho Park, Jaejun Yang, Sehan Park, Jihie Kim
Published: 31 Dec 2022, DOI: 10.3390/electronics12010195

Detection of Cervical Foraminal Stenosis from Oblique Radiograph Using Convolutional Neural Network Algorithm
Jihie Kim, Jae Jun Yang, Jaeha Song, SeongWoon Jo, YoungHoon Kim, ***Jiho Park***, Jin Bog Lee, Gun Woo Lee, Sehan Park
Published: 12 Apr 2024, DOI: 10.3349/ymj.2023.0091

Projects

Sketch Image Generation using Vision Language Models — *Dongguk University, 2024.07 - Present*

- Generating sketch images based on prompts using Stable Diffusion feedback from visual-language models (VLMs).
- Inspired by Reinforcement Learning and DDPO methods, I used VLMs feedback to generate sketch images effectively.
- Applied contrastive learning and fine-tuned the decoder and text encoder to reflect the characteristics of the sketch images better.
- Submitted a paper at IJCAI 2025

Simulating Mobile Robot Vision: An Analysis of RGB-D versus RGB-Based Distance Accuracy and CPU Optimization — *University of Toronto, 2024.03 - 2024.06*

- Implementation of two ROS packages for efficient human detection: RGB-D and RGB with pre-trained YOLOv8 Nano and fine-tuned MobileNetV2 using the 3D KITTI dataset.
- Comparative analysis of RGB and RGB-D camera setups for depth estimation and object detection.
- Optimization of the models for low CPU usage through conversion and quantization techniques, such as OpenVINO and post-training quantization.
- I implemented and experimented with each package, analyzed the experiment results, and wrote the paper.
- One paper accepted at ICAIIC 2025

3D Hand-Object reconstruction and compositional action using collaborative learning and superquadrics — *Dongguk University, 2023.09 - 2023.12*

- Proposed a new learning framework that enhances hand-object geometric reasoning, significantly improving compositional action recognition.
- Using superquadrics for improved object representation and exploring compositional action recognition by testing with non-overlapping verb-noun combinations in training and testing.
- I trained superquadrics parameters for using them to recognize and represent 3D objects with shapes closer

to their true form instead of using traditional 3D bounding boxes.

- One paper accepted at AAAI 2025

Sketch Image Generation & Editing using Diffusion Model and Dialog Context *Dongguk University*
2023.03 - 2023.12

- Generating and modifying images according to the user's sketch image within the context of a dialogue with the Chatbot, fostering cognitive development in the elderly and infants/toddlers through drawing activities.
- I was responsible for sketch image generation and editing part. I built a new sketch image dataset for fine-tuning the Stable Diffusion and ControlNet model because existing sketch image datasets cause noise in sketch image generation.
- Awarded the SK CEO Award at the ICT Challenge 2023

Building and Validation Multi-modal Motion Capture Dataset *Dongguk University*
2022.05 - 2023.12

- Built and validated two motion capture datasets: a dataset with daily life objects for comprehensive 3D human action analysis (DGU-HAO) and a dataset for 3D human action analysis on utterances (DGU-HAU).
- I analyzed two datasets, validated the first dataset using the 3D human action recognition model MMNet, and wrote the papers.
- Two papers are published: 10.1109/ACCESS.2024.3351888, 10.3390/electronics12234793

Dexterous Hand-Object Grasp Control with Prosthetic Hand *University of Birmingham*
2022.09 - 2023.02

- Conducted research to enable prosthetic hands to interact naturally with objects, drawing on studies of human hand-object interaction, such as the D-Grasp project.
- Selected Modular Prosthetic Limb (MPL) model as a prosthetic hand and RaiSim as a physical engine for training. Domain adaptation is employed to transform the dataset to fit the MPL model.
- I transferred the MPL model from the Mujoco engine to the RaiSim engine and tried to train using the DexYCB dataset.
- One paper accepted to IFSA 2023
- I gave an oral presentation of the paper from this project at IFSA 2023.

Deep Learning-Based Approaches for Classifying Foraminal Stenosis Using Cervical Spine Radiographs *Dongguk University*
2022.06 - 2022.12

- Designed a framework that can diagnose cervical foraminal stenosis using only X-rays, which are relatively inexpensive compared to the MRI typically used for diagnostic tests.
- Applied YOLOv5, spatial transformer networks (STN), histogram equalization, transfer learning, and fine-tuning to achieve a high-performance classification model.
- One patent application (10-2023-0048150): "Method and system for classifying foraminal stenosis occurrence of the deep learning algorithm base utilizing the cervical spine X-ray"
- One paper published: 10.3390/electronics12010195

Post Emergency Power Management for IoT Based Precision Agriculture Irrigation System Using Cost-Effective Algorithm *Purdue University*
2021.10 - 2021.12

- In a power emergency where the power of a smart farm was cut off due to natural disasters, the automatic water supply system devised a power operation algorithm that could efficiently use the power to care for more crops until the power is recovered and compared with the existing system.
- Implemented power efficiency algorithm for auto irrigation system by Python.
- Communicated sensor data with LoRa, LoRaWan between the end device and the Cloud (TTS) using LoRa module, LoRaWAN gateway, and Node-RED.
- Project GitHub, Project Paper

Pink Voice, to increase the effectiveness of subway seats for caring for pregnant women *Dongguk University*
2020.12 - 2021.02

- I implemented a QR authentication function within the Android application using ZXing and the Android application's real-time subway seat status-checking function.

- I designed an Arduino and sensor circuit to collect the data from the pressure sensor and transfer it to the database.
- Awarded second place at the Value-up Program, Project GitHub

Self-Driving Soccer Robot using LEGO Mindstorm and RobotC *Dongguk University*
2017.09 - 2017.12

- I implemented the line tracing function of the soccer robot using a color sensor and object detecting function to recognize the ball using an infrared sensor.
- I analyzed the potential scenarios in a soccer match, developed a strategy, coded it, and integrated it into the robot.
- Our team won first place in the tournament.

Technologies

Languages: Python, C++, C, Java, JavaScript, SQL, Swift

Technologies: PyTorch, TensorFlow, ROS2, Flask, React.js, Vue.js, Android SDK, iOS SDK, MySQL, Firebase, Arduino, OpenCV, Apache, MariaDB, MuJoCo, RaiSim, Spark

Certifications: SQLD (Sql Developer) (2020.06.30, Kdata)

Other Undergraduate Projects

Parking lot automatic system *Dongguk University*
Course: Software Engineering *2020.10 - 2020.12*

- Implementation of a website that recognizes the license plate using OCR and reserves the parking lot for the time to use it.
- Followed the overall development process by software engineering, it proceeds in the order of planning, design, implementation, and testing.
- I implemented the overall front-end using JavaScript, HTML, and CSS and designed the system UI.
- Awarded the 2nd place Project GitHub

Intelligent campus-based application service development *Dongguk University*
Course: Software Engineering *2020.09 - 2020.12*

- Implementation of the IoT system ¡Lab, Alpha Room, Power Control System¿ to handle the wasted power.
- The system includes the following functions: Cutting off the light power of the Alpha Room when human movement is not detected for a certain time and monitoring the current situation of the Alpha Room.
- I display output values of sensors to the Web through Wi-Fi communication using nodeMCU and HC-SR501 sensors to monitor the current situation and handle the power of the Lab.

Video Conferencing System using WebRTC *Dongguk University*
Course: Open Source Software Project *2020.09 - 2020.12*

- Implementation of a video conference system includes video chat, text chat, screen sharing, and whiteboard functions using open-source WebRTC.
- Followed the overall development process by software engineering, it proceeds in the order of planning, design, implementation, and testing.
- I implemented Back-End using STUN&TURN server, Node.js, React-based HTML, express. connect the user's video and audio through Signaling.
- Project GitHub

Video editing program using Leap Motion and OpenCV *Dongguk University*
Course: Human-Computer Interaction *2019.04 - 2019.06*

- Implementation of a video editing system using Leap Motion to recognize the shape of the hand and execute its function using OpenCV.
- The system includes the following functions: Cut and save video, fast-forward and rewind, apply filter to video, play and pause video
- I recognize the shape of the hand using Leap motion and execute functions that correspond to had shapes.

I designed the program UI.

Movie Planet, an iOS app *Dongguk University*
iOS App Development Training Boot Camp *2018.12 - 2019.02*

- Implementation of an App that users can leave a record after watching a movie and view the record like a calendar. When the user achieves the goal, the user receives stars and can grow a bigger planet.
- The App includes the following functions: Add records, Import movie posters from Naver Movie API, Photo Library or Camera app, Set goals, Grow the own planet.
- I implemented the setting goals function using TableView and planetary raising function, which compensates users for consistent use of the app. I designed the UI.
- Launched on the app on the AppStore. Project GitHub

Websites recommending travel destinations *Dongguk University*
Course: Web Programming *2018.10 - 2018.12*

- Implementation of a website that recommends Seoul travel destinations that suit users' tastes.
- The web includes the following functions: Show recommended destinations on a map, Leave a travel review on the community board, and Recommend destinations that suit users' tastes.
- I implemented the front end using JavaScript, HTML, and CSS and designed the UI.