Minjun Chang

Department of Mechanical Engineering, Yonsei University, Republic of Korea

E-mail: wkdalswns0427@yonsei.ac.kr | Phone: (+82)10-2876-0427 | Website: https://wkdalswns0427.github.io/

Research Interest | *Robotics, Locomotion, Motion Planning, Marine, Autonomous Driving, RL, Connectivity*

Education

Yonsei University, Seoul, Republic of Korea — Mar 2019 – Feb 2025(Expected)

- B.S., Mechanical Engineering (GPA: 3.33/4.3)
- **Senior thesis:** Adaptive control with State-Estimator for Bipedal Locomotion

Selected Honors and Awards

1st place, National ICT Smart Device Competition, *Ministry of Science and ICT* — *Aug 2024*

- Award ***by the Minister of Science and ICT***
- Led a team of 5 in developing an *Autonomous Manufacture Assistant* CARTRASCHE
- Designed a mobile robot with rotating shelf system using SLAM for navigation in ROS
- Implemented custom RC filter and encoder-less motor control algorithm for activation
- Operated based on: Linux OS, ROS1, Python and C++ [News, Project Page, Video]

1st place, 2022 Autonomous Driving Robot Racing Contest, *Korean Robotics Society* — *Nov 2022*

- Developed a control algorithm with ROS, utilizing LiDAR, IMU, and GPS for collision avoidance
- Implemented sensor fusion algorithm on ROS platform for localization
- Operated based on: Linux OS, ROS1, ROS2, Python and C/C++ [News, Contest Video]

Selection, Hanium Contest, *Federation of Korea Information Industries* — *Nov 2021*

- Led a team of 4 in developing *Personalized Digitial Content Literacy program EYE-TUNER*
- Implemented pupil tracking algorithm for the program [Project Page]

2nd place, Medical Hack 2021, *Busan City* — *Nov 2021*

- Implemented posture prediction algorithm with multiple load-cell sensors

2nd place, Yonsei IHEI Workstation, *Yonsei University* — *Jul 2020*

- Designed an autonomous urine analysis apparatus and its actuator system [Video]

Work Experiences

GOLE Robotics (Robotics Engineer, Path Planning & SLAM) — *Apr 2024 – Jun 2024*

- Implemented A* for global path planning and sMPC for local path planning on ROS2 and robot (WeRo)
- Developed actuator controller package with C++/Python binding

DRIMAES (Embedded Software Engineer, Research Engineer) — *Oct 2022 – Mar 2024*

- Linux, ARM MCU software/firmware programming
- Developed various communication protocols (Serial, MQTT, REST, CAN)
- Implemented multiple virtual container management technique on cross-platform systems

ToysMyth (Embedded Software Engineer, Research Engineer) — *Feb 2022 – Oct 2022*

- Developed embedded software for Mediatek, ESP chipsets,
- Enhanced custom OpenWRT OS kernel

Alsemy (Al Lab Intern, Intern) — *Jun 2021 – Aug 2021*

- Implemented prediction data smoothness verification metric

Publications and Conferences

1. H.W. Nam[1], S.Y. Choi[1], **Minjun Chang[1]**, J.H. Yang[1], J.H. Lim, Jongeun Choi*, "State prediction-based control input delay compensation for autonomous driving systems", *The 18th Korea Robotics Society Annual Conference (KRoC 2023, Feb. 15-18, 2023)* [1]*equal contribution,*
   - Oral presentation in a special session, "Autonomous Driving Robot Racing Technics"

Research Experiences

Dynamic Robot System Laboratory, Seoul National University *Jul 2024 – Present*
Undergraduate Intern. Supervisor: Prof. Jaeheung Park
- Developing a reinforcement learning framework with simultaneous state estimator training for locomotion
- *"Simultaneous Training of State-Estimator and Symmetry Configuration for Bipedal Locomotion"* Poster

Machine Learning and Control System Laboratory, Yonsei University *Jul 2022 – Jan 2023*
Undergraduate Intern. Supervisor: Prof. Jongeun Choi
- Developed an enhanced localization algorithm with control input delay compensation

Mechanobiology and Soft Materials Laboratory, Yonsei University *Jul 2020 – Jun 2021*
Undergraduate Intern. Supervisor: Prof. Hyungseok Lee
- Developed Handheld Standing Surface Acoustic Wave Cell Alignment Device
- Proposed "bridged hold design" for SSAW cell alignment and simultaneous UV reactive angiogenesis

Selected Projects

Development of Fleet Management System for multi-robot cluster, *Hyundai Robotics* *Aug 2023 – Dec 2023*
- Implemented task scheduling and allocation algorithm based on order status for multi-robot network
- Operated based on: Linux OS, Python, Custom MQTT Protocol on Hyundai Robotics serving robots

Leafeon Cluster: Indoor Atmospheric Environment Observer, *Personal Project* *Feb 2023 –Sep 2023*
- Developed an atmosphere observing device with remote data collecting server and visualizing dashboard
- Operated based on: ESP32WROOM, AWS RDB, Jekyll Frontend [github]

FennecBot: Industrial Anomaly Detection Mobile Robot, *SM Instruments* *Mar 2023 – Aug 2023*
- Developed multi-modal deep learning network for pipeline anomaly detection and the classification of pipeline leakage using RGB camera, and ultrasonic/acoustic sound camera
- Operated on Scout mini with line-tracing algorithm detecting pipe leakage within Hyundai HI. factory

SAJOGI: Boston Dynamics Spot Micro project, *RoboIn* *May 2022 – Nov 2022*
- Buit a small scaled four-legged robot based on *Boston Dynamics SPOT* morphology [github]

Extracurricular Activities and Leadership

YAI, Artificial Intelligence Club, Yonsei University *Mar 2022 – Present*
- Studied open courses and papers about robot learning and wrote review articles

RoboIn, Robotics Club, Yonsei University *May 2020 – Present*
- President (2021-2022), Vice President (2021), Executive Staff (2020 - 2023)
- Robot Projects: quadruped robot (based on SPOT of Boston Dynamics), quadrotor drone, hexapod
- Conducted Seminars: basics of CNN, basics of reinforcement learning, serial communication

Patents and Copyrights

The Urine Examination Apparatus and Controlling Method of the Same Nov 2023
(KR10-2020-0176792, under prosecution)

Autonomous Human Following Manufacture Assistant Robot Aug 2024
(Korea, in preparation)

Eye Tuner: Media Literacy Program based on Pupil Tracking by Computer Vision Nov 2021
(Korea Copyright Commission, C-2021-050308)

Skills Summary

Programming Languages: Python, C/C++, MATLAB

Frameworks/Tools: ROS, Docker, PyTorch, FastAPI, IsaacGym, AWS, Solidworks, CREO, ANSYS

Hardware: Jetson Xavier, Jetson Nano, RaspberryPi, Arduino, STM32, ESP32, Bolt10, Scout Mini, ERP42

Languages: Korean (Native), English (Fluent, iBT TOEFL 103 / *personal best 111*)