HOJUNE KIM

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RESEARCH INTERESTS

Robot Autonomy: State Estimation, Autonomous Navigation, Multi-agent Systems
Optimization Theory: Graph Optimization, Recursive Estimation, Distributed Optimization
System Engineering: System Design, Modelling and Manufacture (Worked on Car / Drone / Quadruped / Humanoid)

EDUCATION

Seoul National University (SNU) Mar. 2019 – Present
B.S. in Aerospace Engineering, summa cum laude (expected) *Seoul, South Korea*
- GPA: **4.00/4.00(Major)**, 3.91/4.00(Overall) * 1.5-year absence from military service

ETH Zürich Feb. 2024 – Aug. 2024
Exchange Student in Mechanical Engineering *Zurich, Switzerland*

WORKING EXPERIENCE

German Aerospace Center DLR Sept. 2024 – Present
Humanoid TORO team, Guest Researcher, Advisor: Prof. Jinoh Lee *Munich, Germany*
- Topic : Humanoid Navigation via Semantic Mapping with Kinematic aided Visual Inertial Odometry

RESEARCH EXPERIENCES

Vision for Robotics Lab | ETH Zürich Feb. 2024 – Aug. 2024
Semester Project Intern, Advisor: Prof. Margarita Chli *Zurich, Switzerland*
- Topic : Continuous-Time SLAM via Gaussian Belief Propagation for distributed system

Robust Perception and Mobile Robotics Lab | SNU Jan. 2023 – Mar. 2024
Undergraduate Researcher, Advisor: Prof. Ayoung Kim *Seoul, South Korea*
- Topic : Robust mmWave Radar Odometry / Direct SLAM with Infrared camera and LiDAR
- Topic : Handheld Sensor System Development / Camera-LiDAR-Radar Calibration via Graph Optimization

Satellite Geophysics Lab | SNU Aug. 2020 – May. 2021
Undergraduate Researcher, Advisor: Prof. Duk-jin Kim *Seoul, South Korea*
- Topic : Real-time flood monitoring system via semantic segmentation using satellite SAR image

PUBLICATION

Peer-Reviewed Workshop Paper
- <u>H. Kim</u>, H. Jang and A. Kim. 2D Ego-Motion with Yaw Estimation using Only mmWave Radars via Two-Way weighted ICP. ***ICRA2024 Workshop*** *on Radar in Robotics, Yokohama, Japan, 2024. (Oral) [paper]*

HONORS & AWARDS

Awards:

Minister of National Defense Award, Minister of Defense Startup Competition, $5,000 funding Dec. 2022
Ministry of National Defense, Republic of Korea
Gold Prize, International Student Car Competition Autonomous Driving Sector Oct. 2021
Ministry of Land, Infrastructure and Transport, Republic of Korea
Final Selected, Star-Exploration Startup Support Project, $9,000 funding Feb. 2021
Korea Aerospace Research Institute(KARI)

Honors:

Korea-Germany Junior Research Fellowship Support, $9,000 | Max Planck POSTECH Sept. 2024
- Full coverage of expenses during in DLR as a guest researcher

Kwanjeong Undergraduate Scholarship, $17,000 | Kwanjeong Educational Foundation Mar. 2021
- Full coverage of junior and senior tuition and stipend

Global Leadership Program Scholarship | SNU   Feb. 2024
Certificate of Appreciation(AI Tech Play) | Dean, College of Engineering in SNU   Jun. 2021
Undergraduate Research Internship Scholarship | SNU   Mar. 2021
Merit-based Scholarship | SNU   Fall 2019, Spring & Fall 2020

SELECTED GRADUATE COURSE PROJECTS

Perception and Learning for Robotics | ETH Zürich   Spring 2024
Topic: Crowd Navigation with LiDAR via Reinforcement Learning
- Trained End-to-end model by teacher-student policies in Orbit(built on Isaac Sim)

Decision Making for Autonomous Aerospace Systems | SNU   Spring 2023
Topic: Fault Tolerant Control of Quadrotor
- Designed Controller via Feedback Linearization, Sliding Mode and Backstepping methods on faulty condition

Sensor-Based Spatial Intelligence | SNU   Fall 2023
Topic: Analysis of LiDAR-Inertial SLAM in long-term localization
- Compared and evaluated the Fast-LIO2 and Faster-LIO in urban datasets

MEMBERSHIPS & ACTIVITIES

SNU Tomorrow's Engineers Membership(STEM) | SNU   Sept. 2023 – Present
- Launched academic mentoring : Organized a mentoring seminar for engineering freshmen
- Launched academic talks : LiDAR vs Radar in perception field / Start-up business model building

Bulnabi, Autonomous Flight Drone Club | SNU   Feb. 2023 – Jan. 2024
- Developed auto-landing algorithm with path planning via bézier curve for continuous trajectory and control
- Verified in Gazebo simulation and on-board flight tests; finalizing technology transfer to the company

Army Aviation Operations Command | Republic of Korea Army   Aug. 2021 – Feb. 2023
CH-47D Helicopter Flight Attendant & Maintenance Mechanics
- Produced CH-47D maintenance and put on tactical missions including forest fire extinguish for 60+ hours flight

SNU ZERO, Autonomous Driving Car Club | SNU   Jan. 2021 – Oct. 2021
- Performed Extended-Kalman Filter with IMU, GPS and line detection for robust localization
- Developed dynamic obstacle avoidance by clustering LiDAR and combining vision detection

AI Tech Play(KAIT Foundation), Non-Profit Organization for AI education   Feb. 2021 – Aug. 2021
Co-organizer & Hardware Team Leader
- Served as Organizer : AI-driven RC car competition for nationwide students(200+ students participated)
- Served as Developer : Developed novel AI-driven RC car system from scratch for education and competition

Science Volunteer Corps | SNU   Jul. 2019
- Held science experiment and mentoring camp for middle and high school students in Gochang

TEACHING EXPERIENCES

Teaching Assistant
(M3228.001300) Basic of Robot Programming and Mechanical System Design | SNU   Spring 2023
- Taught machine learning algorithms in Python and developed propeller competition kits for 100+ students

Teaching Tutor
(033.014) Engineering Mathematics 1 | SNU   Fall 2023
(M2795.002100) Dynamics | SNU   Fall 2023

PATENT

Parking Location Tracking System, KR102291377B1   2021
- <u>H. Kim</u>, T. Kim, J. Na, J. Lee, S. Jeong

SKILLS

Programming: C/C++, Python, Matlab, Javascript **Sensors**: mmWave Radar, LiDAR, RGB-d/Thermal camera
Frameworks: ROS, Isaac Sim, Gazebo, Pytorch, Ceres **Manufactures**: SolidWorks, 3D printer, Laser cutter