Mingi Jeong

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https://mingijeong.github.io/
https://github.com/MingiJeong/

Interests

Autonomous navigation, Aquatic Robot, Obstacle detection and tracking, Obstacle avoidance, Motion planning, Multi-robot system, Decision-making, Environmental monitoring, Optimized design and building

Education

Dartmouth College Aug. 2019 - Present
Graduate Student New Hampshire, USA

- Ph.D. student of Computer Science, Guarini School of Graduate and Advanced Studies
- *Relevant coursework*: robotics perception systems, robot principal design and programming, multi robot system, artificial intelligence, machine learning and statistical data analysis, operations research, algorithms

Korea Maritime and Ocean University
Graduate Student Mar.2017 - Feb. 2019

- M.S of Maritime Safety Environment Engineering Busan, Korea
- Total GPA of 4.5/4.5 (100/100)

Undergraduate Student Mar.2007 - Feb. 2012

- Bachelor of Maritime Police Science
- Total GPA of 4.45/4.5 (99/100), Graduated with Diploma of Honors, ***Valedictorian***

Maritime College – State University of New York Aug. 2010 – June. 2011
Exchange Student New York, USA

- International Transportation and Trade Major
- Total GPA of 3.838/4.0, ***First Korean Indoctrination officer***

Research Experience

Reality and Robotics Laboratory, Dartmouth College Aug. 2019 – Present
Research Assistant (Advisor: Professor Alberto Quattrini Li)

- As part of EPSCoR project (NSF grant No. 1923004) – Computational Methods and Autonomous Robotics Systems for Modeling and Predicting Harmful Cyanobacterial Blooms, involving multiple institutions: Dartmouth College, Bates College, Colby College, University of New Hampshire, University of Rhode Island, University of South Carolina, I designed and developed robotic boat-based sampling approaches
  - Main lead of building, design, operation, deployment, software stack of custom robotic boats
  - Main lead of training sessions for the boat operation, data handling for collaborating institutions
- As part of PRIME military project for defense of urban city from hacking and drone attacks, I designed and developed autonomous control and visualization modules in war scenarios

Coast Guard Laboratory, Korea Maritime and Ocean University Mar. 2017 – Feb. 2019
Research Assistant (Advisor: Professor Eun-Bang Lee)

- As part of national R&D project on development of management technology for HNS accident by Ministry of Oceans and Fisheries in Korea, 2017-2018 (total 8 years, 18 million USD), I developed multi-criteria route planning and risk contour mapping with a patent
- As part of in national R&D project on fundamental research on maritime accident prevention, 2017, I surveyed marine accidents by communication failures and devised a manual for shipping companies

- As part of research project on enhancement of investigation and response to marine accident by Korea Shipowners' Association, 2017-2018, I surveyed accident analysis methods and proposed preventive approaches of human errors
- As part governmental project on policy development plan of coast guard system by Korea Coast Guard, 2017, I analyzed coast guard resources by developing a data mining tool and proposed a framework on cutting-edge coast guard technologies

Publications

Fully-Refereed International Conference Papers

[1] Jeong, M. (*First Author*) and Quattrini Li, A., 2023. "MARCOL: A Maritime Collision Avoidance Decision-making Testbed", Proceedings of AAAI Conference on Artificial Intelligence, ***Under Review.***

[2] Deb T., Dix J., Jeong, M. (*Co-Author*), Molinaro C., Pugliese A., Quattrini Li, A., Santos E., Subrahmanian VS, Yang S. and Zhang Y., 2023. "DUCK: A Drone-Urban Cyber-Defense Framework based on Pareto-Optimal Deontic Logic Agents", Proceedings of AAAI Conference on Artificial Intelligence, ***Under Review.***

[3] Jeong, M. (*First Author*) and Quattrini Li, A., 2022. "Motion Attribute-based Clustering and Collision Avoidance of Multiple In-water Obstacles by Autonomous Surface Vehicle", Proceedings of IEEE International Conference on Intelligent Robots and Systems (IROS), ***Accepted.***

[4] Jeong, M. (*First Author*) and Quattrini Li, A., 2021. "Efficient LiDAR-based In-water Obstacle Detection and Segmentation by Autonomous Surface Vehicles in Aquatic Environments", Proceedings of IEEE International Conference on Intelligent Robots and Systems (IROS), Prague, Czech Republic, pp. 5387-5394, [LINK] ***Published.***

[5] Jeong, M. (*First Author*) and Quattrini Li, A., 2020. "Risk vector-based near miss and real-time obstacle avoidance for autonomous surface vehicles", Proceedings of IEEE International Conference on Intelligent Robots and Systems (IROS), Las Vegas, NV, USA, pp. 1805-1812, [LINK] ***Published.***

[6] Roznere, M., Jeong, M. (*Co-first Author*), Maechling, L., Ward, N. K. , Brentrup, J. A., Steele, B., Bruesewitz, D., Ewing, H., Weathers, K., Cottingham, K. L., and Quattrini Li, A., 2021, "Towards a reliable heterogeneous robotic water quality monitoring system: An experimental analysis", Book chpater of International Symposium on Experimental Robotics (ISER), [LINK], ***Published.***

Fully-refereed International Journal Articles

[1] Arsenault E., Shingai Q., Jeong, M. (*Co-Author*), Ewing H., Steele B., Bruesewitz D., Cottingham K., Lutz D., Roznere M., Masaba K., Quattrini Li A., Wu Y., Quinn A., Zhong R., Ma E., Braslau H., Bourbonnais A., and Venkatachari A., 2022, "Autonomous surface vehicles reveal spatiotemporal variability in lake surface waters", Ecosphere ***In prep.***

[2] Jeong, M. (*First Author*), Lee, E.-B., Lee, M., Jung, J.-Y., 2018. "Multi-criteria Route Planning with Risk Contour Map for Smart Navigation", Ocean Engineering. 172, 72-85. [LINK] ***Published.***

[3] Jeong, M. (*First Author*), Lee, E.-B., Lee, M., 2018. "A Study on Intuitive Technique of Risk Assessment for Route of Ships Transporting Hazardous and Noxious Substances", Journal of Navigation and Port Research. 42, 97–106. [LINK] ***Published.***

[4] Jeong, M.-G. (*First Author*), Lee, E.-B., Lee, M., 2017. "A Study on the Visualization of HNS Hazard Levels to Prevent Accidents at Sea in Real-time", Journal of Korean Society Marine Environment and Safety. 23, 242–249. [LINK] ***Published.***

Patent

[1] Lee, E.-B., Jeong, M., Lee, M. "A Technique to Plan a Route Based on Risk Contour Mapping", 10-2185782, Korea

Lightly-Refereed Conference

[1] Jeong, M. (*First Author*), Roznere, M., Lensgraf, S., Sniffen, A., Balkcom, D., and Quattrini Li, A., 2020, "Catabot: Autonomous surface vehicle with an optimized design for environmental monitoring", Proceedings of MTS/IEEE OCEANS – Singapore, (student poster competition, **top 20 submissions**).

[2] Jeong, M. (*First Author*), Lee, E.-B, Park, Y.-S., and Quattrini Li, A., 2019, "A risk visualization technique based on static and dynamic data for maritime mobility", Proceedings of MTS/IEEE OCEANS – Seattle, WA. ***Published.***

[3] Jeong, M. (*First Author*), Lee, E.-B., Lee, M., 2018. "An Adaptive Route Plan Technique with Risk Contour for Autonomous Navigation of Surface Vehicles", Proceedings of MTS/IEEE, OCEANS 2018, Charleston, USA. ***Published.***

[4] Jeong, M. (*First Author*), Lee, E.-B., Lee, M., 2018. "A Purpose-Oriented Technique for Route Planning of Ships based on the Concept of Risk Isoline Curves", Proceedings of International Association of Institutes of Navigation(IAIN) World Congress 2018, Chiba, Japan. ***Published.***

Conference and Workshop Presentations

Presenting Author

International Conference (Oral Presentations)

[1] Jeong, M., Roznere M., Masaba K., Chadda A., and Quattrini Li A., 2022. "Towards Full Pipeline Development of Decision-making for Autonomous Surface Vehicles in Challenging Aquatic Environments", UKC (US-Korea Conference), Virginia, USA (**Best presentation paper award**)

[2] Roznere M., Jeong, M. (*Co-first Author*), Masaba K., Trout-Haney J., Lutz D., Cottingham K., Palace M., and Quattrini Li A., 2022. "Towards context-based sampling for environmental monitoring heterogeneous robots and remote sensing technologies", presentation in ICRA Robotics for Climate Change Workshop, Philadelphia, USA

[3] Jeong, M., Lee, E.-B., Lee, M., 2018. An Adaptive Route Plan Technique with Risk Contour for Autonomous Navigation of Surface Vehicles, MTS/IEEE OCEANS 2018, Charleston, USA

[4] Jeong, M., Lee, E.-B., Lee, M., 2018. A Purpose-Oriented Technique for Route Planning of Ships based on the Concept of Risk Isoline Curves, International Association of Institutes of Navigation World Congress (IAIN) 2018, Chiba, Japan

[5] Jeong, M., Lee, E.-B., Lee, M., 2017. A Study on Optimal Route Plan of Ships Carrying HNS, Hebei Spirit Oil Pollution International Conference (10 years of monitoring and the future), Incheon, Korea (**Best presentation paper award**)

Domestic Conference (Oral Presentations)

[1] Jeong, M., Lee, E.-B., Yoon, J.-H, Lee, M., Kang, W.-S., 2018, A Study on Object-oriented Route Design for Ships Carrying HNS, Spring Annual Conference, Korean Institute of Navigation and Port Research, Jeju, Korea (**Best presentation paper award**)

[2] Jeong, M., Lee, E.-B., Yoon, J.-H., Ha, M.-J., Kim, T.-H, Lee, M., 2017, A Study on Risk Simulation for Risk-based Readiness and Response to HNS Marine Accident, Fall Annual Conference, Korean Society of Marine Environment & Safety, Busan, Korea

[3] Jeong, M., Park, J.-S., Ha, W.-J., Park, K.-E., Lee, M.-K., 2017, Language Barriers and Communication Problems under Multi-cultural Environment and Marine Accident, Fall Annual Conference, Korean Institute of Navigation and Port Research, Busan, Korea

[4] Jeong, M., Lee, E.-B., Lee, M., 2017, A Study On the Risk-based Designation of Courses for Navigation of Autonomous Ships Carrying HNS, Fall Annual Conference, Korean Institute of Navigation and Port Research, Busan, Korea

[5] Jeong, M., Lee, E.-B., Yoon, J.-H., Ha, M.-J., Kim, T.-H, Lee, M., 2017, A Study on the Development of the Dynamic HNS Risk Charts, Spring Annual Conference, Korean Society of Marine Environment & Safety, Mokpo, Korea

[6] Jeong, M., Lee, E.-B., Yoon, J.-H., Ha, M.-J., Kim, T.-H, Lee, M., 2017, A Basic Study on the Development of Automated Risk Display System in Real-time, Spring Annual Conference, Korean Institute of Navigation and Port Research, Busan, Korea

Professional Experience

Sea Machines Robotics Inc. Jun. 2022 – Sep. 2022
Software Engineer Intern Boston, USA

- Work for both Autonomy and Perception teams
- Set up, configured a LiDAR sensor for data collection on-board autonomous boat
- Built ROS2 packages with Docker: real-time calibration for LiDAR camera fusion, adaptive clustering for LIDAR, perception stack including heterogeneous sensor drivers
- Participate in marine captain's council to promote products as per market needs

Hyundai Merchant Marine Co.,Ltd Apr. 2011 – Dec. 2016
Chief Mate (Final rank) Busan, Korea
Former Third, Second Mate

- Served as navigation officer on LNG vessels and Container Vessels
- Supervised new building and dry dock of large LNG vessels at ship yards
  - $174K$ LNG vessel 'MARIA ENERGY' at Hyundai Heavy Industries, Korea
  - $150K$ LNG vessel ' NEO ENERGY' at Keppel shipyard, Singapore
  - $135K$ LNG vessel 'HYUNDAI OCEANPIA' at MMHE shipyard, Malaysia
- Received overall employee evaluation report 99 percentile
- Developed operation manual of container vessel for foreign crews
- Developed operation manual of Electronic Chart Display and Information System after implication

Honors and Awards

[1] ***Best Presentation Paper Award***, Korean Scientists and Engineers Association, 2022
[2] SEED Director Award, Scientists and Engineers Early Career Development (SEED) Workshop, Korean Scientists and Engineers Association, 2022
[3] Future Ocean Technologist Award, Minister (Ministry of Ocean and Fisheries in Korea), 2019
[4] Naval Architecture and Marine Expert Project, Best Award by C.E.O of Daewoo Shipbuilding & Marine Engineering Co., Ltd., 2019
[5] ***Best Presentation Paper Award***, Korean Society of Marine Environment & Safety, 2018
[6] ***Best Presentation Paper Award***, Korean Institute of Navigation and Port Research, 2017
[7] Honorable Mention, Competition for Simulated Response to Marine Pollution, Korea Marine Environment Management Corporation (KOEM), 2017
[8] Honorable Mention, Competition for Marine Safety Images and Photos, Busan Regional Officer of Oceans and Fisheries, 2017
[9] Best Proposal Award, 'Countermeasures for GPS malfunction', Hyundai Merchant Marine, 2014
[10] *Award for Graduation with Distinction*, Korea Maritime and Ocean University, 2012
[11] Dean's List, Korea Maritime and Ocean University, 2007-2011
[12] Admiral's List, Maritime College – State University of New York, 2011
[13] English Presentation Contest 1st Award, Korea Maritime and Ocean University, 2011

Scholarships

[1] *2,000 USD*, KSEA-KUSCO Scholarships, Korean-Amercian Scientists and Engineers Association, 2022
[2] Global Marine Scholar Sponsorship, Korea Marine Pilot Association, 2019
[3] *Full tuition*, Research Assistant Scholarship, Korea Maritime and Ocean University, 2017-2018
[4] *Full tuition*, Hyundai Education Scholarship, Hyundai Merchant Marine, 2010-2011
[5] *1,000 USD*, Alumni Heritage Scholarship, Maritime College – State University of New York, 2010-2011
[6] *24,000 USD*, Rotary International Ambassadorial Scholarship, Rotary Foundation, 2010-2011
[7] *Full tuition*, Best Honors Scholarships, Korea Maritime and Ocean University, 2007-2010

Teaching Assistant Experience

Principles of robot design and programming Fall 2020, Fall 2021
Teaching assistant Dartmouth College
Radio electronic navigation Mar. 2017 – Dec. 2018
Tutor Korea Maritime and Ocean University

Review Activities

Conference papers: ICRA 2022, ICRA 2021, IROS 2020, ISER 2020.
Journal: RAL 2021.

Extra Curricular Activities

NH SeaGrant CoastWise Oct. 2021 - Present
Cohort-based coastal immersion program New Hampshire, USA

- Cultivate an engaged and diverse workforce working on coastal resilience and marine resource issues in NH, build new skills and stronger networks, drive more engaged and impactful coastal research across disciplines
- Learn about sustainable technologies/strategies to build resilience, shares functions and focus areas with the national network

Student Expert Field Trip May. 2019
Korea Team Awardee Oslo, Norway / Paris, France

- Fully supported by Korea Offshore & Shipbuilding Association (KOSHIPA)
- Visit to OECD, NOR-Shipping 2019, Bereau Veritas (BV), NAUSICA marine museum and discuss about marine sustainability issues as a representative of Korea

OQEANOUS Summer school program – Shanghai Ocean University Aug. 2017
Student Leader in Korea Team Shanghai, China

- Took lectures regarding use of oceans and marine resources for sustainable development
- Gave an English presentation for results in summer school as a representative of Korea
- Participated in various activities and events such as a welcoming party, student dinners, and field trips

29th IMLA - International Maritime English Conference Oct. 2017
Volunteer Busan, Korea

- Organized events such as field trips and venue preparation prior to speakers' presentations
- Managed schedules, translated, and guided foreigners during the conference

Summer Sea Term of Training Ship Empire States VI May. 2011 – Jun. 2011
Maritime College – State University of New York New York, USA
Cadet in deck training

- Took US Coast Guard license courses such as naval architecture, celestial navigation, ship's structure, and ship operation & management
- Navigated for four European countries: Denmark, Poland, Latvia, and Ireland
- Participated in navigational watch and training program for student study groups

Regiment of Cadets Dec. 2010 – May. 2011
Maritime College – State University of New York New York, USA
Indoctrination officer

- Planned and supervised indoctrination for over 50 newly matriculating cadets in assigned squad
- Coordinated with squad leader to train cadets as a one team on deck training program
- Held daily roll call and watch for maintenance of regimental system
- Taught nautical science classes for training Midshipmen Undergraduates

Rotarian – Rotary Foundation (Host District: 7230) Jul. 2010 – Jun. 2011
Ambassadorial scholar and Volunteer New York, USA

- Participated in rotary service projects through Rotary Ideal of Service Above Self
- Worked with host counselor by participating in district projects for home construction for the impoverished
- Attended rotary conferences and gave presentations to neighboring clubs to promote interaction

International Mermaid Congress – Istanbul Technical University Jun. 2010
Student Leader in Korea Team Istanbul, Turkey

- Gave an English presentation for topics on studies of marine navigation as a representative of Korea
- Coordinated with team members to conduct group researches

International Cadet Conference – Japan Coast Guard Academy Jul. 2008 – Aug. 2008
Student Leader in Korea Team Hiroshima, Japan

- Gave an English presentation for topics on coast guard studies as a representative of Korea
- Participated in team program with cadets from United States and Canadian Coast Guard Academy

Mentorship Experience

Lab Mentor Sep. 2019 – Present
Dartmouth Reality and Robotics Lab

- *Master students*: Ben Wolsieffer (2020-2021), Siddharth Agrawal (2020-21)
- *Undergraduate students*: Edwin Onyango (2022), Ari Chadda (2021-2022), Phuc Tran (2021-2022), Amy Wu (2021-2022, University of Florida), Luca Chun Lit (2021), Chloe Nicolaou (2020-2021), Brian Wang (2020), Andrada Pantelimon (2020), Alex Rodriguez (2020), Lily Maechling (2020), Suzan Eskalen (2020)

EpsCor Mentor May. 2021 – Present
Supporting students from other institution

- teaching and training use of custom robotic boat Catabot, autonomy modules
- support on-field experiment, operation, and data collection by Robotic boat Catabot
- *Undergraduate students*: Abigail Quinn (2021-present, Bates College), Lilo Wu, Hannah Braslau, Evan Ma (2021-2022, Bates College), Anna Shorb, Roujia Zhong (2021-2022, Colby College), Kenny Douyon Kim, Jack Moore (2021, Colby College)

Technical Skills

Computing

Robots	Custom built robotic boats (Catabot1,2,3,4), ROSbot2.0, DJI Mavic Mini
Sensor, device:	Velodyne VLP-16 LiDAR, Ouster OS1-64 LiDAR, Intel Real Sense, YSI EXO2 sonde, Pixhawk, RoboClaw ESC, AirMar echo sounder
Languagues:	Python, C++, MATLAB, R
Tools and Libraries:	ROS 1,2 (Robot Operating System), Docker, AirSim, Git, Latex
Software:	ArduPilot, UnrealEngine, Gazebo, Rhino, ORCA 3D, Simerics MP

Relevant Certificate:

- Marine Big Data Professional, and Marine IoT Professional by Research Institute of Medium & Small Shipbuilding in Korea
- Python (Computing) by International Computer Driving License (ICDL)

Ship operator

- ***Chief Mate***, Endorsed license for ships unlimited tonnage upon oceans
- RADAR/ARPA operator, GMDSS, Liquefied cargo handling
- US Powerboating, Safe boat handling license by United States Sailing Association
- Yacht operator's license by Korea Coast Guard

References

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Joseph C. Hoffman
Professor

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Academic-Affairs Department
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