JIYOON HWANG

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Summary

Two years of experience in building two mobile robots. Eight months of experience in controlling robotic arms. Four month of embedded system development experience. Three years of research experience at Navigation, Control & Design for Autonomous Systems Lab. **Key accomplishments include**:

- Responsible for all software parts of the safety mobile robot and make the robot drive through waypoints.
- Built a self-driving restaurant server robot with position error of 3.0 cm and winning the prize for excellence.
- Selected as the final three teams in the Korea CubeSat Competition and launched the satellites into space.

Work Experience

Robotics Research Intern Oct. 2020 – June 2021
Korea Atomic Energy Research Institute, Nuclear Robot Division Daejeon, Republic of Korea

- Developed a user interface to send control commands and monitor the status of the KUKA iiwa robot arm and Force torque sensor & IMU data based on the Microsoft Foundation Class (MFC) Library. Built a hot cell testbed for evaluation of remote operation and shared autonomy preliminary framework with the team.
- Created an autonomous mobile robot with Dr. Ryu that can drive via waypoints without collisions by fusing the data obtained from a RealSense tracking camera, LiDAR, and GNSS module based on ROS and Cartographer.
- Tested driving a safety mobile robot with 3D LiDAR and a gamma-ray detector in a cave located 0.68 miles underground and obtained a 3D map of the cave.

Projects

NSF Visual Assistant Robot Project Jan. – May 2022
Humanitarian Robotics and AI Laboratory, Texas A&M University College Station, TX

- Design hardware experiments to implement visual assistant between UAV and UGV.

NVIDIA Platform-based Developer Training Project May – Nov. 2019
Hancom MDS Academy Pangyo, Republic of Korea

- Built a self-driving restaurant server mobile robot that can serve food to certain tables with two team members, winning the Prize for Excellence in the project.
- Compared driving performance of the robot between RTAB-Map based navigation and 2D Lidar SLAM based navigation using ROS Navigation Stack.
- Developed spot the difference game with LCD touch screen on Samsung S3C2450 mobile processor.

CANYVAL-X CubeSat Mission Jul. 2015 – Jun. 2016
Yonsei University Seoul, Republic of Korea

- Developed reaction wheel controller as a researcher of Attitude Determination and Control System using C and MATLAB for the CANYVAL-X (CubeSat Astronomy by NASA and Yonsei using Virtual Telescope Alignment eXperiment) project, which is the mission to implement flight formation of two separated CubeSats and won the Korea CubeSat Competition Final Award.

Education

M. S. Candidate in Computer Science Aug. 2021 – May 2023
Texas A&M University, College Station, TX

- Courses: Computer Architecture, Software Engineering, Algorithms, Machine Learning, Systems and Robotics.

Part-time Student in Computer Science Mar. 2020 – Jun. 2021
Korea National Open University, Seoul, Republic of Korea

M.S., Navigation, Control & Design for Autonomous Systems Lab Jun. 2016 – Feb. 2019

B.S. in Physics and Astronomy Mar. 2012 – Aug. 2016
Yonsei University, Seoul, Republic of Korea

- Courses: Optimal control, Theory of automatic control, Nonlinear control, Space guidance navigation and control, system control, Satellite orbit estimations and filterings.

Skills

Programming: C/C++, Python, MATLAB/Simulink, (Entry level) JavaScript, HTML, Ruby
Framework/Tools: Robot Operating System (ROS1), Linux (Ubuntu), TensorFlow, OpenCV, Git, JIRA

Publications and Conference Proceedings

[1] **Hwang, J.**, Lee, J., & Park, C. (2021). Collision avoidance control for formation flying of multiple spacecraft using artificial potential field. *Advances in Space Research*.

[2] Ryu, D., **Hwang, J.**, Han, J., Im, G., Kim, H., "Shared Autonomy Preliminary Framework for Remote Operation in a Hot cell Testbed", in *Proceedings of the 16th Korea Robotics Society Annual Conference*, Republic of Korea, May 19, 2021.

[3] Park, J-P., Park, S-Y., Song, Y., Kim, G. N., Lee, K., Oh, J. H., Yim, J-C., Lee, E., Hwang S-H., Kim, SW., Choi, K. Y., Lee, D. S., Kwon, S. H., Kim, M-S., Yeo, S-W., Kim, T-H., Lee, S-h., Lee, K. B., Seo, S-W., Cho, W-H., Lee, J., Park, J-H., Kim, Y. W., Kang, S. J., **Hwang, J.**, Lee, S.H., Yang, J-H., Jin, S., Lee, Y., "CANYVAL-X Mission Development Using CubeSats." *Space Operations: Contributions from the Global Community*. Springer, Cham, 2017. 681–691.

[4] **Hwang, J.**, Lee, K., and Park, C., "Trajectory Control for Obstacle Avoidance of Multiple Autonomous Space Vehicles in Formation Keeping", in *Proceedings of 2018 Korean Society for Aeronautical & Space Sciences Spring Conference*, Republic of Korea, April 18–21, 2018.

[5] **Hwang, J.**, Lee, K., and Park, C., "Simultaneous Trajectory/Attitude Control for Obstacle Avoidance of Autonomous Flight Vehicles using Artificial Potential Field and Rotational Force Field", in *Proceedings of 2017 Korean Society for Aeronautical & Space Sciences Fall Conference*, Republic of Korea, November 15–18, 2017.

Research Interests

Robotics, Autonomous driving, Reinforcement Learning, Deep Learning, Sensor Fusion

Scholarships and Grants

Texas A&M University — College Station, TX

- Graduate Research Assistant Scholarship — Jan. 2022 – May. 2022

Yonsei University — Seoul, Republic of Korea

- Institute of Earth Atmosphere Astronomy Brain Korea 21 Grant — Mar. 2016 – Feb. 2019
- Office Assistant Scholarship — Mar. – Aug. 2018
- Teaching Assistant Scholarship — 2016 – 2017

Extracurricular Activities

Official Backstage Interviewer — Nov. 2020
2020 New Space Korea: Uplift — Seoul, Republic of Korea

Official Backstage Interviewer — July 2019
2019 Korea Space Forum — Seoul, Republic of Korea