JOSHUA JULIAN DAMANIK

Robotics researcher on learning-based agile robot navigation

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Experience

Laboratory for information and Control Systems, KAIST   **Aug. 2021 – Present**
PhD Researcher   *Daejeon, South Korea*
- Research on learning-based navigation algorithm for safe and agile, high-speed mobile robot.
- Developed immitation learning for industrial robot navigation in cluttered environment, experiment speed 1.5 m/s.
- 1st winner on simulation and 1st winner on physical navigation challenge on ICRA 2024 BARN Challenge.
- Research on flight pattern and air traffic flow on Incheon Airport (Collaborative research with Incheon Airport).

Daewoong Pharmaceutical   **Jan. 2024 – Feb. 2024**
Full-stack Web Developer Freelance   *Daejeon, South Korea*
- Designed UI/UX for company project web portal using React, deployed to production on serverless architecture, AWS.
- Developed the database system using DynamoDB and authentication system using AWS Cognito.

Projects

The 3rd F1tenth Korea Championship | *Learning-based Perception, ROS, C++, Python, Gazebo*   **Jul. 2024 – Present**
- Built F1tenth racing car hardware, including design and wiring.
- Developed F1tenth racing car simulation using ROS 2 and Gazebo Harmonic.
- Built robotics software stack for racing car using ROS 2 on NVIDIA Jetson and Arduino.
- Developing learning-based dynamics model using Transformer for robust controller.

ICRA 2024 BARN Challenge | *Imitation learning, Python, ROS, Gazebo, 2D LiDAR*   **Apr. 2024 – May 2024**
- 1st winner on physical competition of BARN Challenge 2024. Fastest navigation performance.
- Achieved all-time-high score on simulation competition at BARN Challenge (bit.ly/barn-challenge-2024)
- Developed an imitation-learning based navigation stack for Jackal robot. Used Transformer model.

Skills

Robotics hardware: 2D/3D LiDAR, Depth camera, Sensors & actuators, NVIDIA Jetson, Raspberry, Arduino
Robotics design: Solidworks, OnShape, Autodesk Fusion, Altium Designer
Robotics software: ROS, Gazebo (Classic & Gz), Webots, Matlab
Machine learning: PyTorch, Tensorflow, Reinforcement learning, Immitation learning, Time-series analysis
Software development: Python, C++, Docker, Git, Linux, Javascript
Web development: React, Node.js, SQL, AWS, Svelte, MongoDB, DynamoDB
Language: English (TOEIC 970), Korean (한국어능력시험 6급), Indonesian (Native)

Education

Korea Advanced Institute of Science and Technology   **Aug. 2021 – Aug. 2025**
PhD in Aerospace Engineering, Fully funded by Hyundai Motor CMK Foundation   *Daejeon, South Korea*
Korea Advanced Institute of Science and Technology   **Aug. 2019 – Aug. 2021**
MS in Aerospace Engineering, Fully funded by Korean Government Scholarship Program   *Daejeon, South Korea*
Bandung Institute of Technology   **Aug. 2014 – Jul. 2018**
BSc in Engineering Physics   *Bandung, Indonesia*

Highlight Publications

IEEE Robotics and Automation Magazine | *Co-author*   **Sep. 2024**
Autonomous Ground Navigation in Highly Constrained Spaces: Lessons Learned from The Third BARN
Challenge at ICRA 2024

IEEE Transactions on Aerospace and Electronic Systems | *2nd author*   **Aug. 2024**
Aircraft Trajectory Segmentation-based Contrastive Coding: A Framework for Self-supervised Trajectory
Representation (In review)

IEEE Robotics and Automation Letters | *1st author*   **Jun. 2024**
LiCS: Navigation using Learned-imitation on Cluttered Space (In review)

Journal of Control and Decision | *Co-author*   **Jul. 2023**
Polygon formation of multiple nonholonomic mobile robots with double-level-control collision avoidance
scheme