

Minhyuk Park

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EDUCATION

PhD, Computer Science, (August 2024 - now)

Texas State University, San Marcos, Texas, United States

Advisor: Tsz-Chiu Au

Master of Science, Computer Science, (March 2022 - August 2024)

Ulsan National University of Science and Technology, Ulsan, South Korea

Dissertation: Wind Field Modeling for Formation Planning in Multi-Drone Systems

Advisor: Tsz-Chiu Au

Bachelor of Engineering (Dual), Mechanical and Aerospace Engineering, Feb 2022

Bachelor of Engineering (Dual), Computer Science and Engineering, Feb 2022

Ulsan National University of Science and Technology, Ulsan, South Korea

RESEARCH INTEREST

Application of **robotic systems** using **AI** methodologies such as

- 1) Multirobot system
- 2) Autonomous driving
- 3) Vehicle motion planning
- 4) Real-time object detection

RESEARCH PAPERS

1. **Minhyuk Park**, Tsz-Chiu Au, *Wind Field Modeling for Formation Planning in Multi-Drone Systems* IEEE International Conference on Robotics and Automation (ICRA) Yokohama 2024
2. **Minhyuk Park**, Tsz-Chiu Au, *Challenges in Using Drone Swarms as Video Game Platforms*, Workshop on Human-Multi Agent Interaction, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) Detroit 2023
3. Moon, H., Martinez-Carranza, J. et al. *Challenges and implemented technologies used in autonomous drone racing*. Intel Serv Robotics 12, 137–148 (2019)

RESEARCH POSTERS

1. **Minhyuk Park**a, Jaebak Hwanga, Hong-Tack Kimb, Young Min Parkb, Kwon Hee Hongb, Nam Il Herb, Dohee Leeb*, *Motion Planning Algorithm of An Articulated Robotic Arm for Inspecting Double Null Divertor in Fusion Experimental Device*, *2024 IEEE International Conference on Robotics and Automation (ICRA) Workshop Robotics for Nuclear Environments*
2. Dohee Leea,1*, **Minhyuk Park**b,1, Sangwoo Haa, Jaebak Hwangb, Hong-Tack Kimb, Young Min Parka, Kwon Hee Honga, Nam Il Hera *Study of a Task-Motion Planning for Maintenance Tasks of Multi Purpose Deployer in In-Vessel of Fusion Experimental Device*, *2024 IEEE International Conference on Robotics and Automation (ICRA) Workshop Robotics for Nuclear Environments*

LEADING PROJECT

Multiagent Systems

- 1) Motion planning considering inter-swarm aerodynamic interference
- 2) Building drone swarm system using collision avoidance algorithms: *Artificial Potential Field* (APF) and *Buffered Voronoi Cell* (BVC)
- 3) AGV motion planning based on Ackerman steering cars

Autonomous drone racing

- 1) Leading UNIST Dronebot team in IROS autonomous drone racing.
- 2) In charge: Constructing custom drone (3D print), Designing Computer-Aided Control system based on ROS and hardware setup (Optitrack, ZED camera, RTK GPS, and Jetson TX2)

Delivery drones

- 1) Real-world experiments with a custom physical drone and anemometer

Service robot

- 1) Conceptual design of AI Companion Voice-controlled service robot system
- 2) Design of the service robot based on design specifications
- 3) Voice recognition and human skeleton detection

PARTICIPATED PROJECT

1. Reinforcement learning based Delivery drone development, UNIST AI Challengers Program 2023
Time-optimal visual obstacle avoidance and planning for autonomous emergency drone delivery systems, use of electromagnet with drones
2. Smart 3d printer farm development, UNIST AI Challengers Program 2022
Generative AI (Variational Auto Encoder) and object detection (Darknet YOLO) for 3d printer diagnostics
3. Survey drone development, UNIST AI Challengers Program 2021
Outdoor and indoor survey drone development

INVITED TALK / PRESENTATION

“Challenges in Using Drone Swarms as Video Game Platforms” in Workshop on Human-Multi Agent Interaction, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) Detroit 2023

PATENT

Minhyuk Park, Byung Soo Kim, Kim Nam Hoon, Automated quality verification of FDM 3D printing output using image data and establishment of image data collection environment, 2023 (South Korea)

HONORS AND AWARDS

1. 5th place, DNA+ Outdoors **Autonomous drone** survey Flight Competition Final rounds, September 2021
2. 4th place, IROS 2018 Award for **Autonomous Drone Racing**, October 2018
3. 2nd Place, Airbus **Autonomous Drone Racing**, Seoul Adex August 2017

TEACHING EXPERIENCE

1. Teaching Assistant in Introduction to Robotics, 2021-2023
2. Artificial Intelligence as Teaching Assistant, 2022,2023
3. Data-based Machine Learning Design and Deployment as Teaching Assistant, 2022
4. UNIST Language Education Center English 1:1 English Peer Tutoring Tutor, 2017
5. Engineering Programming 1 as Lab Assistant, 2015

OTHER QUALIFICATION

- Korean vehicle licenses - 1st class Unmanned Multicopter pilot's license, 4th class Unmanned Fixed Wing pilot's license (VTOL Fixed-wing aircraft capable), 2nd class Driver's license
- Proficient in English (TOEFL 102 (2024), TOEIC 958(2021)) and a native Korean speaker. Basic conversational skills in Japanese (N3, 2020) and Chinese
- Certificate of Completion - Program requirements of Unmanned Aircraft Systems, for commitment and performance in UNIST aerospace-related subjects, September 16th, 2021, no 2021-5