

Haesung Oh

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RESEARCH INTEREST

Autonomous Vehicles/Robots

- Decision making with AI-Based Approach using Deep Learning
- Autonomy optimization using Multi Agent Reinforcement Learning

EDUCATION

POSTECH, Convergence IT Engineering , Bachelor's Degree (GPA: 3.09/4.3)	Feb 2016 - Feb 2023
UC Berkeley , Exchange Student	Jun 2017 - Dec 2017
Seoul Science Highschool	Feb 2013 - Feb 2016

RESEARCH EXPERIENCE

Metal-Organic Frameworks Feature Regression *Advisor: Seungchul Lee* Sep 2022 - present

- Regression model that predicts features of MOF in an inverse design manner
- Optimizes the regression model by tuning hyperparameters
- *Keywords: Hyperparameter Tuning, Lazy Regression, Extra-tree Regression*

Autonomous Recycle Robot (Dudaji Start-up Company Internship) Jul 2022 - Aug 2022

- 6-joints-robot that classifies and does pick-and-place trashes by using ROS, Deep Learning, and computer vision
- Contributed to robot detection by camera, robot movement optimization via ROS, pick-and-place logic development, converting algorithm from computer vision to robot coordinate, and collecting plastic waste image data for classification
- *Keywords: Robotics, ROS, Computer vision, Yolo v5, Deep learning, Pick-and-place*

Autonomous Delivery Mobile Robot (SNU ARIL Internship) *Advisor: Sungwoo Kim* Dec 2021 - Feb 2022

- 6-wheel, skid steering autonomous delivery robot for SNU campus
- Contributed to autonomy simulation and robot mobility optimizing
- *Keywords: ROS, Unity simulation, Embedded system, 3D CAD, Hardware assembly*

Autonomous Parking Simulation *Advisor: Suhee Han* Sep 2021 - Dec 2021

- An autonomous parking simulator using Unity ML-Agent and reinforcement learning
- Trained an average of 8 million episodes for the front, parallel, and diagonal parking situations, respectively
- *Keywords: Reinforcement learning, AI-based autonomy, Autonomy simulation, Unity ML-Agent*

Autonomous Drone *Advisor: Suhee Han* Feb 2021 - Jun 2021

- An autonomous drone avoids obstacles and terrain and comes back safely using ultrasonic sensors
- Targets to explore an extreme environment based on a rule-based approach which is dependent on obstacle conditions
- *Keywords: Rule-based autonomy, Arduino, Obstacle detection, PID control, Drone system dynamics*

Auto Training Routine Recording System *Advisor: Chulhong Kim* Sep 2020 - Dec 2020

- Detects human pose to get exercise, repeats and sets automatically for weight training using computer vision
- *Keywords: OpenPose, Pose estimation, Vector similarity*

Auto Strike Zone Detection *Advisor: Sungjun Jung* Feb 2018 - Jun 2018

- Auto strike zone detection for baseball
- *Keywords: Computer vision, Real-time, Line detection, Object detection*

RELATED COURSES (SELECTED)

Hyundai H-Mobility Class: Autonomous Car Class

Jul 2022 - Jan 2023

Keywords: Recognition, Decision making, Machine learning, Vehicle system control, Vehicle network

MECH527: Adv. Artificial Intelligence for M.E.

Fall 2022

Keywords: Tensorflow, CNN, XAI, LRP, Transfer Learning, CAE, FCN, GAN, RNN, GNN, PINN

MECH437: Artificial Intelligence for M.E.

Spring 2022

Keywords: Deep learning, SVM, KNN, K-Means, Decision tree, PCA, SVD, ICA, ANN, Autoencoder

CITE490I: Creative IT Advanced Lecture: Robotics Introduction

Spring 2022

Keywords: Components, Locomotion, Mechanics, AI, Autonomy, SLAM, Recent trend of Robot

MECH323: System Control

Fall 2021

Keywords: LTI, Closed-loop, System stability, PID control, Root locus, Bode plot, Nyquist plot, Compensation

MECH211: Dynamics

Fall 2020

Keywords: Force, Torque, Work, Energy, Linear motion, Angular motion, Momentum, Impact, Rigid body

CITE201, 202, 301, 302: Creative IT Design I, II, III, IV

Spring 2018 - Fall 2021

Keywords: Personal research projects

HONORS AND AWARDS

Creative ICT Scholarship

Feb 2016 - Dec 2021

MSIT(Ministry of Science and ICT), Korea, under the ICT Creative Consilience program

Korea Art Management Service: ART Hack-A-Thon

May 2018

Excellence Prize: *Art and coding education using drones for the next generation*

SKILLS

Programming Language Python, ROS, C/C++, Git

2D/3D Graphic Unity, Fusion 360, AutoCAD

EXTRA-CURRICULAR EXPERIENCES

Military Service: Republic of Korea Airforce

Nov 2018 - Sep 2020

Military residence management airman, A representative of airmen

Berkeley Media Club: Berkast

Nov 2017 - Dec 2017

Actor, Cinemaphotographer, and Video editor

Creative IT Camp

Aug 2016, Aug 2018

Team leader, Instructor, and Photographer

POSTECH Photography Club: Bitt-Noeul

Feb 2018 - Jun 2018

Photographer, and Photography advisor

POSTECH Baseball Club: Tachyons

Feb 2016 - Dec 2022

Catcher, First-baseman, Cleanup hitter, and Team captain

POSTECH Musical Club: OPCA

Feb 2016 - Jun 2016

Actor, Played a musical named 'Laundry' as the main character