# Haesung Oh

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## Research Interests

**Autonomous Vehicles/Robots**

- Decision making with AI-Based Approach using Deep Learning for Autonomous Vehicles/Robots
- Autonomy optimization using V2X communication technology
- Autonomy simulation using Reinforcement Learning

## Education

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|---|---|
| **POSTECH** | **Feb 2016 ~ Feb 2023** |
| Creative IT Engineering Department | *including 22 months of military service* |
| **UC Berkeley** | **Jun 2017 ~ Dec 2017** |
| Exchange Student | |
| **Seoul Science High School** | **Mar 2013 ~ Feb 2016** |

## Research Experiences

**Autonomous Recycle Robot (Dudaji 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

Role: Robot detection in camera, Robot movement management via ROS, and Pick-and-place logic development

*Keywords: Robotics, ROS, Computer vision, Yolo v5, Deep learning, Pick-and-place*

**Autonomous Delivery Mobile Robot: Duckpod ver. 3 (SNU ARI Lab Internship)**　　　**Dec 2021 ~ Feb 2022**

6-wheel, skid steering autonomous delivery robot for SNU campus

Role: Robot structure design, Mobile robot simulation design

*Keywords: ROS, Unity simulation, Embedded system, 3D CAD, Hardware assembly*　　　　*Advisor: Sungwoo Kim*

**Autonomous Parking Simulation**　　　　　　　　　　　　　　　　　　　**Sep 2021 ~ Dec 2021**

Using Unity ML-Agent and reinforcement learning to simulate and visualize autonomous parking

*Keywords: Reinforcement learning, Computer graphics, Autonomous vehicle, Unity ML-Agent*　　*Advisor: Suhee Han*

**Autonomous Drone**　　　　　　　　　　　　　　　　　　　　　　　　**Feb 2021 ~ Jun 2021**

Drone that drives autonomously with avoiding obstacle and terrain and comes back safely using ultra sonic sensors

*Keywords: Autonomous flight, Arduino, Obstacle detection, PID control, Drone system dynamics*　　*Advisor: Suhee Han*

**Auto Training Routine Recording System**　　　　　　　　　　　　　　　**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*　　　　　　　　　　　*Advisor: Chulhong Kim*

**Auto Strike Zone Detection**　　　　　　　　　　　　　　　　　　　　　**Feb 2018 ~ Jun 2018**

Auto strike zone detection for baseball using OpenCV

*Keywords: Computer vision, Real-time, Line detection, Baseball detection*　　　　　*Advisor: Sungjun Jung*

**Cable Detection and Tracking Algorithm Control of Quadrotor**　　　　　　　**Sep 2014 ~ Nov 2014**

Quadrotor drone that follows cable by detecting it

*Keywords: Cable detection, Hough transform, Canny edge, Gimbal camera, Color threshold*　　*Advisor: Jinbae Park*

## Related Courses

**Hyundai H-Mobility Class: Autonomous Car Class**                                    **Jul 2022 ~ Jan 2023**

*Keywords: Recognition, Decision making, Deep learning*

**MECH437: Artificial Intelligence**                                                                      **Spring 2022**

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

**CITE490I: Creative IT Advanced Lecture: Robotics Introduction**                          **Spring 2022**

*Keywords: History, Classification, Components, Locomotion, Mechanics, AI, Autonomy, SLAM, and Recent trend of Robot*

**MECH323: System Control**                                                                                    **Fall 2021**

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

**GEDU141: Writing English Paper**                                                                         **Fall 2021**

*Keywords: Parallelism, Repetition, Topic noun structure, Structure of research paper*

**MATH200: Differential Equation**                                                                        **Spring 2021**

*Keywords: Laplace transform, Fourier series*

**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**

**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**                                                                                      **Nov 2018 ~ Sep 2020**

Republic of Korea Airforce: Military residence management Airman

**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

**POSTECH Musical Club: OPCA**                                                               **Feb 2016 ~ Jun 2016**

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