# Tae Yang

taeyang@stanford.edu, 617-838-8421, tae-h-yang.github.io, linkedin.com/in/tae-yang

## EDUCATION

**Stanford University, Stanford, CA**

M.S. in Computer Science (Specialization in AI), GPA: 4.1/4.0 *Expected Jun 2026*

Relevant Courses: AI Principles & Techniques, Robot Perception, Decision Making under Uncertainty

**Northeastern University, Boston, MA**

B.S. in Computer Engineering and Minor in Robotics, Summa Cum Laude *May 2024*

Relevant Courses: Computer Vision, Machine Learning & Pattern Recognition, Robotics Sensing & Navigation, Mobile Robotics, Robot Dynamics & Control

Activities: Korean Computer Science Community (Founder), Med Finder Startup (Engineering Lead), Husky Startup Challenge (3rd Place Winner), Eta Kappa Nu, Tau Beta Pi, IEEE

## RESEARCH & WORK EXPERIENCE

**ToddlerBot Team – Stanford University, Stanford, CA** *Jan 2025 – Present*

- Integrate motion features into ToddlerBot, an open-source, low-cost humanoid robot developed collaboratively by Stanford's TML and REAL labs.
- Develop a web-based application to enable user collaboration and generate an extensive motion dataset for research.

**Autonomy & Intelligence Lab – Northeastern University, Boston, MA** *Jan 2024 – Aug 2024*

- Configured Unitree Go1 robot dog with 3D LiDAR sensor fixture and ROS2 environment on robot's Jetson board.
- Integrated state estimation from DLIOM (Direct LiDAR Inertial Odometry and Mapping) with ROS2 Nav2.
- Achieved navigation with custom nodes that convert velocities from Nav2 to robot's high-level SDK commands.

**Hardware Automation Engineering Intern – iRobot, Bedford, MA** *Jul 2023 – Dec 2023*

- Implemented image processing (Blurring, Filtering, Edge Detection, Binary Threshold, and Structural Similarity Index Measure) to grade dirtiness of tiles images in Python and C#.
- Evaluated robot's motion characteristics (parallelism, straightness, coverage, etc.) analyzing Qualisys motion capture data.
- Created power supply C# libraries by converting SCPI commands from manuals and establishing USB or RS-232 connections.

## TEACHING EXPERIENCE

**EECE 2160 Embedded Design: Enabling Robotics TA – Northeastern University, Boston, MA** *Fall 2022, Spring 2024*

- Instructed students during labs covering FPGA, Quartus Prime, Linux, C++, and robotic arm.
- Graded assignments for Digital Logic Design and C++, focusing on pointers, dynamic memory, data structures, and OOP.

**EECE 2140 Computing Fundamentals TA – Northeastern University, Boston, MA** *Spring 2023*

- Conducted office hours to assist students with Python programming covering syntaxes, DSA, OOP, NumPy, unit testing, etc.
- Graded Python assignments by designing and implementing comprehensive rubrics.

## ENGINEERING PROJECTS

**Autonomous Vehicle Decision-Making for Uncontrolled Intersection Navigation** *Oct 2024 – Dec 2024*

- Designed and implemented a simulation environment for autonomous vehicle navigation at an uncontrolled intersection using SUMO, incorporating MDP and POMDP frameworks.
- Implemented and trained Deep Q-Network (DQN) and Deep Recurrent Q-Network (DRQN) to enable optimal decision-making in high-dimensional and partially observable environments, accounting for vehicle interactions and hidden states.

**UUV (Underwater Unmanned Vehicle) Localization - 2nd Place, Capstone Design Competition** *Jan 2024 – Apr 2024*

- Developed underwater communication system using transducers, GPS, and STM32 microcontrollers for UART, ADC, and DAC interfaces on Raspberry Pi.
- Implemented Bayesian inference and Markov Chain Monte Carlo (MCMC) methods for geolocation with noisy Time-of-Flight (ToF) measurements incorporating model uncertainties for robust position estimation.

**Image to Robot Drawing Trajectory Converter** *Jul 2023 – Aug 2023*

- Undistorted images captured by robot's fisheye camera using its intrinsic parameters and distortion coefficients.
- Detected outlines of objects in images with cascade classifier to locate ROI of objects and Canny Edge Detection.
- Converted outlines to robot drawing trajectories by searching closest outline pixels and indicating non-drawing area.

**School Tunnel Mapping** *Mar 2023 – May 2023*

- Collected 2D LiDAR, RGB-D camera, and VectorNav IMU data in school tunnel using ROS drivers.
- Performed Hector, Gmapping, Cartographer SLAM, RTAB-Map, and ORB-SLAM 3 on the sensor data to generate grid maps and point cloud maps and compare each algorithm's result.

**Autonomous Reconnaissance Robot** *Nov 2022 – Dec 2022*

- Configured Turtlebot3 robot with 2D LiDAR, Pi camera, SBC, and OpenCR board installing ROS and Turtlebot3 packages.
- Performed Frontier-Based Exploration using Gmapping SLAM in closed testbed to generate occupancy grid map.
- Transformed coordinates of AprilTags detected by Pi Camera from camera frame to map frame to display tag poses on map.

## SKILLS

**Programming:** C/C++, C#, Python, MATLAB | **Development Tools:** ROS, ROS2, Linux, Git, Docker | **Hardware & Electronics:** 2D/3D LiDAR, Fisheye/Stereo/RGB-D Camera, 9-DOF IMU, GNSS/RTK, Raspberry Pi, Nvidia Jetson, STM32