Tae Hoon Yang

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EDUCATION

Northeastern University, Boston, MA

B.S. in Computer Engineering and Minor in Robotics, GPA: 3.95/4.0 — May 2024

Relevant Courses: Machine Learning & Pattern Recognition, Robotics Sensing & Navigation, Mobile Robotics, Robotics, Robot Dynamics & Control, Probability & Statistics, Digital Design & Computer Organization, Embedded Design, Linear Systems, Algorithms, Networks, Electronics

Activities: Korean Computer Science Community (Founder), Eta Kappa Nu, Tau Beta Pi, IEEE, Entrepreneurs Club Startup Challenge, Susan Bailis Assisted Living Volunteering

SKILLS

Programming: C/C++, C#, Python, SystemVerilog, RISC-V

Computer Applications: ROS, Ubuntu, Linux, Git, MATLAB, Simulink, Quartus Prime

Electronics: Raspberry Pi, Arduino, 2D LiDAR, Stereo/RGB-D Camera, 9-DOF IMU, GNSS/RTK, UART/I2C/SPI

WORK EXPERIENCE

Hardware Automation Engineering Intern – iRobot, Bedford, MA — Jul 2023 – Present

- Implemented image processing (Blurring, Filtering, Edge Detection, Binary Threshold, and Structural Similarity Index Measure) to grade dirtiness of tiles images in Python and C#.
- Created C# libraries to program power supplies with custom methods converted from SCPI commands over USB or RS-232.
- Achieved robot trajectories converted from input images of fisheye camera implementing image processing in Python.

Computing Fundamentals TA – Northeastern University, Boston, MA — Jan 2023 – May 2023

- Held office hours to answer questions related to Python programming syntaxes, libraries, and DSA.
- Graded Python assignment evaluating and comparing students' scripts to rubrics.

Silicon Synapse Lab RA – Northeastern University, Boston, MA — Dec 2022 – May 2023

- Designed custom actuator controller comprised of STM32 MCU, motor driver, DC motor, and hall sensor.
- Assisted graduate students with developing PID controlled quadcopter.

Embedded Design TA – Northeastern University, Boston, MA — Sep 2022 – Dec 2022

- Instructed students during labs covering FPGA board, Linux, C++, Quartus Prime, and robotic arm.
- Held office hours and extra lab hours to answer questions related to C++, Digital Logic Design, and lab assignment.

Communication Equipment Maintenance – ROK Army, South Korea — Jan 2021 – Jul 2022

- Maintained flight recorders, communication and navigation systems installed in 500MD, UH-60 (Black Hawk), and AH-1S (Cobra) aircrafts to be readily operable.
- Repaired mechanical and communication components of pilot helmets.

Electrical Engineering Co-op - Instrumentation Laboratory, Bedford, MA — Jul 2020 – Dec 2020

- Designed test setup to evaluate different types of temperature sensors (e.g., characteristic curves, and response time) using Arduino and MATLAB.
- Investigated wavelength shifts of LEDs depending on their currents and temperatures using SpectraSuite and thermocouple.

ENGINEERING PROJECTS

UUV (Underwater Unmanned Vehicle) Localization — May 2023 – Present

- Designed underwater localization system utilizing inertial pose estimation and beacon triangulation based on acoustic communication and 9-DOF IMU dead reckoning.

On-road Vehicle Detection — May 2023 – June 2023

- Trained deep learning-based object detection models (RetinaNet and YOLOv5) on vehicle dataset using Python.
- Evaluated performance of detection models from test dataset using indicators such as mAP and inference rate.

School Tunnel Mapping — Mar 2023 – May 2023

- Collected 2D LiDAR, RGB-D camera, and VectorNav IMU data in school tunnel using ROS.
- 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

- Utilized Turtlebot3 robot with various ROS and Turtlebot3 packages.
- Performed Frontier-Based Exploration using Gmapping SLAM to generate occupancy grid map.
- Transformed coordinates of AprilTags detected by Pi Camera from robot body frame into grid map frame.

Wearable Fitness Motion Tracker — Aug 2021 – Oct 2021

- Utilized 6-DOF Gyroscope and Accelerometer IMU to track human motion.
- Processed IMU data with the Complimentary Filter to acquire accurate position of human body.
- Programmed C++ algorithm to evaluate correct squat positions of users.

Wii-mote Controlled Robot Arm — Nov 2019 - Dec 2019

- Configured robotic arm on FPGA board using Simulink.
- Connected Wii-mote to FPGA board to receive accelerometer data via Bluetooth using shell script on Linux.
- Programmed C++ algorithm to manipulate the arm based on the movement of the controller.