DAMIEN KOH

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EDUCATION AND SKILLS

Northwestern University, Evanston, IL   *Sep 2021 – Jun 2025*
Eta Kappa Nu Member, Academic Honor Society of the Institute of Electrical and Electronics Engineers (IEEE)
B.S. in Computer Engineering, M.S. in Electrical Engineering specializing in Robotics | Cum. GPA: 3.96 out of 4.0

Skills

ROS2 | Git | Linux | C & C++ | Python | MATLAB | Embedded System Design & Programming (EAGLE & Microchip Studio) | Rapid Prototyping | Basic Machine Learning & Computer Vision | Next quarter: SLAM for Robotics, Intro to Feedback Systems

WORK EXPERIENCE

Northwestern University Center for Robotics and Biosystems   *Jun 2023 – Aug 2023*
Robot Development, Research Assistant
◦ Developed a ROS package for customizable robot teleoperation across various devices, including game controllers and SpaceNav.
◦ Implemented configurable input/output schemes, intuitive naming, and Twist/PointStamped message support to enhance functionality.
◦ Fostered open-source collaboration by encouraging user contributions through demos and documentation for easier adaptation.

Weston Robot (www.westonrobot.com/)   *Jun 2022 – Aug 2022*
Robotics Intern
◦ Developed a Trash-Picking Robot with a team, capable of patrolling an area for trash and disposing of it; developed robot arm and navigation control software in C/C++ and Python using ROS 1 and MoveIt (Demo: www.youtube.com/watch?v=fR2VynbYyuk).
◦ Implemented Machine Learning and Computer Vision alongside peers using YoloV5 for object detection.

National Service - Singapore Armed Forces   *Jan 2019 – Nov 2020*
Army Intelligence and Reconnaissance Officer (Lieutenant)
◦ Served as Deputy Intelligence & Security Officer of 16th Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance Battalion (16 C4I Bn). Attended the Battalion Advanced Intelligence Analysis Course and Officer Cadet School.

PROJECTS & STUDENT INVOLVEMENT

Translator & Writing Robot - PolyglotBot   *ME 495 Embedded Systems in Robotics*
◦ In a team, developed an autonomous system translating written phrases and writing them onto a whiteboard with a Franka Robot Arm.
◦ Implemented a custom ROS MoveIt library, OCR & Translation APIs, and AprilTags; custom MoveIt library includes varied path planning tasks, pose/orientation options, immediate/delayed path execution capabilities, and dynamic updating the planning scene.
◦ As Systems Integrator, coordinated to make sure every member's subsystem worked together and managed the team's git workflow.

Omnid Robot Teleoperation & Visualization (www.youtube.com/watch?v=SEuFfONryL0&t=105s)   *Robotics Research*
◦ Implemented Rviz visualization for Northwestern's Omnid robots, enhancing testing and diagnostic capabilities; aided ROS2 transition.
◦ Developed teleoperation feature for Omnids, supporting varied control modes and enabling experiments in human-robot collaboration.
◦ Navigated and adapted Omnid robots' complex codebase, effectively collaborating and coordinating with other researchers via Git.

Autonomous Exploration Robot   *ME 495 Embedded Systems in Robotics*
◦ Programmed a virtual robot for autonomous exploration in a simulated environment using Frontier Exploration in Gazebo, developing a custom ROS node in Python for dynamic navigation and terrain mapping; providing an introduction for autonomous navigation.
◦ Integrated a ROS-based visualization system for real-time path tracking in Rviz, crucial for debugging and optimizing path planning.

Gesture Tracking Glove Prototype   *EE 327 Electronic System Design II*
◦ Developed a gesture-tracking glove with a custom PCB, using ESP32 and FreeRTOS for dual-core concurrency, and integrated it with 6 DoF sensors and flex sensors for real-time visualization on web platforms: via Javascript and Unity.
◦ Employed Edge Impulse for machine learning gesture recognition and optimized sensor data with algorithms like Madgwick's filter.

Custom Webcam Prototype   *EE 326 Electronic System Design I*
◦ Designed a 50 x 50 mm webcam PCB using EAGLE, incorporating the SAM4S8B MCU, ESP32 WiFi Module, and OV2640 Camera.
◦ Programmed interrupt-driven firmware that uses UART, SPI, and I2C communication protocols, live streaming the camera feed to a connected client through Web-Sockets; Utilized electrical lab equipment and logic analyzers for PCB assembly and debugging.

Kappa Theta Pi (KTP) – Co-ed Pre-Professional Technology Fraternity (www.ktpnu.com/)   *Nov 2022 – Nov 2023*
VP of Programming, Founding Executive Member
◦ Planned and organized KTP's 20+ events throughout each quarter, such as Resume, Networking, and Technical Interview Workshops.
◦ Coordinated 40+ members and exec team to start and maintain concurrent initiatives such as Capstone Projects and Big-Little.
◦ Managed week-long interview process for 80+ applicants, coordinating coffee chats, group interviews, member deliberations and more.

InfernoGuard (www.infernoguardusa.com/)   *Jan 2022 – June 2022*
Hardware Development Team, Intern
◦ Aided sensor device development to optimize device performance; spearheaded InfernoGuard's efforts in the White Space Challenge – conducting primary and secondary research, preparing materials, and presenting. Team won distinguished "Start-Up" Award.