Ong Zheng Kai, Ethan

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Summary

Mechanical Engineering Undergraduate with a passion for robotics in areas such as systems design and task automation. I enjoy taking part in engineering challenges and participating in activities beyond my discipline, such as events management, entrepreneurship workshops, and artistic ventures.

Education

Nanyang Technological University | Singapore
Mechanical Engineering | 07/2025
- CGPA: 4.56
- Robotics and Mechatronics Stream
- **IS-FYP: Hyundai Motor Group Innovation Center Singapore** - 3DGS techniques in reconstructing car components for automative assembly
  - ABB RAPID programming and manual teaching of robotic arms for data capture with Photoneo 3D Scanners
  - Instance segmentation, mesh extraction, & pose estimation using Gaussian Splatting & computer vision techniques

Technische Universität München | Germany
Semester Exchange, Mechanical Engineering | 09/2024
- 7 Modules @ 33 ECTS, Mean Grade 2.5 (A-)
- Computational Thermo-Fluid Dynamics: A+
  - Built iterative and direct numerical FVM solvers for unsteady 2D heat problems
- Cyber Physical Systems: A
  - Embedded programming, schedulability theory for Real-Time Systems

Experience

Panasonic R&D Center | Singapore
Research and Development Intern | 01/2025 - Present
- Conducting cutting-edge research on 3D Gaussian Splatting
- Debugging and development in Three.js and GLSL to improve WebGL rendering pipeline
- Surveying, testing, and implementing experimental Gaussian Splatting software and research papers

Fling Asia | Bangkok
Software Engineer | 12/2023 - 04/2024
- Developed and compiled a cross-platform bulk labelling program that supports Zebra printing and QR encoding, currently implemented in Ceva Logistics Shell Site, Thailand and tested in DHL Harley-Davidson, Thailand
- Led marketing and product demonstrations for Fling's software services to multiple warehouses
- Debugging and improving crucial video-processing and stock check report generation algorithms
- Deployment of Edge computing solution for customers to perform core stock checking procedures
- Laid foundations for box counting application, including a web service using Flask, Python, and MariaDB, and an iOS application using SwiftUI and CoreML

Fling Asia | Bangkok
Engineering Intern | 06/2023 - 11/2023
- Led the design and fabrication of hardware additions for drones, including lighting modules and quadcopter wing testing
- Utilised PyTorch and CUDA for hardware acceleration of drone footage post-processing tasks
- Developed software for consolidating video-processing scripts and SQL queries into a GUI for internal use
- Built a auto-labelling application in PySide6 (Qt framework) for warehouse stock-checking

WSO (FTR) Trainee
Republic of Singapore Air Force | 10/2018 - 07/2021
Appointment: Commander, Air Training Group

- Managed ~10 separate Flying Courses in flight, visa, health, and safety currencies and certifications to ensure timely departures to respective countries
- Planning of inter- and intra- trainee body annual activities and ceremonies
- Forecasting of future manpower capacities, liaising with overseas detachments for course creation and matching
- Underwent flying and operations training through multiple progressive selection stages in Singapore, Australia and France. Supported flight scheduling as an Operations and Life Support Systems Officer, managing Critical-for-flight Safety and Survival Training Currencies

Projects and Extra Curricular Activities

Software Lead, Team Mecatron

- Winner of the Singapore Autonomous Underwater Vehicle Competition 2025, besting over 40 teams from 20 countries
- College of Engineering student ambassador of NTU's flagship marine robotics team
- Actively managing 10 software engineers across an array of navigation, motion, and auxiliary repos to track targets, monitor robot statuses, and perform actions such as object detection, controller logic, and collision avoidance
- Leading codebase migration to Behaviour Trees framework for streamlined mission planning
- Created a task-based recruitment pipeline to streamline learning and selection of aspiring candidates
- Integration of ROS, DVL and IMU sensors, computer vision, and control theory

NTU Overseas Entrepreneurship Programme

- Selected from a large pool of candidates to gain entrepreneurial experience with overseas start-ups
- Provided solutions to product and business issues while working closely with start-up founder
- Attended NTU entrepreneurship workshops and provided detailed analysis, reports and business plans in relation to my assigned start-up

Dyson-NTU Product Development Challenge

- Incorporated engineering graphics, mechatronics, and materials engineering into the construction of a product that solves a self-identified problem within a specified timeframe
- Conducted extensive market research before defining our vision specification
- Performed exhaustive product prototyping and testing using self-learnt knowledge of microcontrollers, 3D-printing, and existing materials. After the challenge, continued developing the prototype for solo entry to the James Dyson Award

First Runner-Up, Espressif Systems U Amaze Venture

- Participated in Robot Operating System (ROS), ESP-EYE and Controls workshops
- Created a unique unmanned vehicle using ROS, basic pose estimation using Aruco tags, and LIDAR to complete a maze in the shortest time

Events Officer, NTU Students' Union Ministerial Open Discussions and Events Committee

- Spearheaded events geared towards open discussions and forums between Singapore Ministers and NTU Students
- Directed event proposals which included logistics, budgeting, manpower, publicity, and timeline considerations
- Oversaw planned collaborative events between NTU and Singapore's national councils.
- Facilitator, ForwardSG Youth Talk by National Youth Council, moderated discussions between participants

Project, Task Based Mobile Robot Project for Singapore Autonomous Underwater Vehicle Competition
- Designed, fabricated, and programmed a line tracking Autonomous Guided Vehicle with a gripper, performing pick-and-place tasks. Utilised Arduino, sensor fusion and basic computer vision
- Lead the installation and integration of sensors with movement, along with soldering of components
- Navigated a dynamic scenario of obstacles and tasks in the shortest time possible. Integrated path planning and task scheduling, while performing dynamic obstacle avoidance

Skills

- **Languages:** English, Chinese
- **Programming:** C, C++, Python, GLSL, SQL, Javascript
- **Tools:** ROS, Docker, Git, Linux, OpenCV, Unity, Qt, Arduino, Three.js, React, Fusion360, Microsoft Office
- **Other skills:** Davinci Resolve, Photoshop