DANIEL YU

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Online Profile

PROFESSIONAL SUMMARY

Before I graduated, I had done many different projects, allowing me to transition into industry fluently. I love tackling different challenging projects, which drives me to proceed with my engineering career. I have a combination of good grades and experience, which makes me a perfect candidate.

EDUCATION

Bachelor of Engineering / Science Conjoint, Mechatronic / Physics, Expected in 04/2024
The University of Auckland - 34 Princes St
GPA: 8.125/9
Transcript upon request

WORK HISTORY

Computer System Intern, 10/2022 - 05/2023
WildEye, 16 York St. Parnell, Auckland, New Zealand

- Led the development of UI software for logging hardware, involving event handling and interface design.
- Applied Agile methodologies for efficient project management across three assignments.
- Utilized C# and Visual Basic for web software development and maintenance.
- Collaborated in web software life cycle, from development to maintenance.
- Reported project progress and adapted plans based on managerial feedback.
- Created operational diagrams for project initiation, enhancing planning clarity.
- Managed project lifecycle using GIT for issue tracking and deployment efficiency.

Summer Researcher, 11/2019 - 02/2020
The University Of Auckland, Auckland

SKILLS

Software:

- C++
- C#
- C
- Python
- MATLAB
- Linux/Bash
- Git
- Docker
- Julia
- ROS2 Humble
- Agile Software Development
- Embedded software
- Development on Jetson Orin Nano, Raspberry PI

CAD tools:

- Altium
- Inventor
- Solidwork
- Ansys

Hardware:

- ZED Camera
- 3D printing and 3D printer fixing
- Shock table and vibration table
- Electromechanical sensor and actuator assembly
- Soldering (surface chip and pin chip)

PROJECTS

Simultaneous Localization and Mapping for autonomous cart cone detection

- Focus on developing a niche duct design for the UAV propeller that minimizes noise production and maximizes thrust power efficiency. As a result, the developed duct design shows 20% thrust-to-power efficiency improvement.
- Prepared 3D printed duct models for analysis by performing complex sample preparation tasks such as pressure analysis of existing duct, CAD, and 3D printing.
- Conducted computational fluid dynamic analysis to analyze the fluid motion and thrust of the designed duct.
- Conducted a thrust-power test and noise level test in the acoustic lab. The apparatus involves microphone probes and NIDAQ devices. Adhered to laboratory safety procedures to maintain compliance with quality control standards.
- Participated in lab meetings and project presentations.

EXTRACURRICULAR HISTORY

Autonomous Software System Engineer, 03/2023 - Current
Formula SAE E47, The University Of Auckland

- Collaborating in a 5-member team to develop an autonomous software system for the Formula SAE car, enabling it to navigate tracks independently.
- Led a 2-person perception team in designing and implementing systems for external environment sensing.
- Conducted extensive literature reviews to benchmark against existing software solutions.
- Designed, tested, and iteratively improved perception software, utilizing Foxglove for result visualization and informing subsequent development phases.
- Co-developed the car's trajectory planning system with a 3-member team.
- Contributed to the development and debugging of Unity-based simulation software for autonomous vehicles.
- Maintained and managed the Jetson Orin Nano environment.
- Utilized Docker to standardize development environments across personal PCs and Jetson Orin Nano.
- Programmed ROS2 Humble nodes in Python for perception, planning, and control systems.
- Developed Unity simulation software using C#.

Autonomous Electrical System Engineer, 03/2023 - Current
Formula SAE E47, The University Of Auckland

- Collaborated in a two-person team to design a high-level autonomous electrical system for the Formula SAE vehicle.
- As part of the perception system, designing a ROS2 node for mapping the cones on the field using messages published from cone detection node.
- Analyzed and implemented the linear transformation equation that transforms the cone position in the local frame to the cone position in the global frame.
- Decided to assume that the sensing system has got Gaussian noise and use Kalman filter to improve the state estimation.
- Test the SLAM node in virtual test cases and real test cases. Use Foxglove to visualize the result and tune the Kalman filter parameters.
- Use Agile Methodology to approach the project.

Ackermann message to CAN message converter node

- Convert from Ackermann message to 32-bit CAN message for transmission.
- Distributing most bits for most important messages, such as steering angle and speed, and distributing the rest for other unimportant messages.

Guidance scheme for drag-sail to deorbit into specific location.

- Part 4 Project of Mechatronic Degree. Aims to design a guidance scheme for drag-sail to deorbit into specific location.
- Understand the physics principle behind the problem to propose a solution that better resolves the problem. Then, conduct Monte Carlo simulation to verify the guidance scheme.

- Researched FSAE regulations and worked closely with design leaders to establish system requirements, utilizing tools like truth tables for clear communication.
- Engaged in brainstorming and literature reviews to explore and evaluate various design options.
- Coordinated with the electrical team leader on concept design, employing Pugh's method for final design selection.
- Analyzed multiple working scenarios of the electrical system using both analytical and numerical methods (e.g., LTSpice), ensuring compliance with established requirements.
- Documented the design process and final verification for review by the chief engineer.
- Participated in team training sessions focused on STM32 development.

Tether Deploying CubeSat Mission Team Member, 02/2023 - 11/2023
Auckland Programme For Space Systems, The University Of Auckland

- As a team of 10, aim to design and develop a CubeSat mission for verifying tether's capability of orbit maneuver.
- As a team of 5, conducted vibration test and shock test for the avionic components. Wrote the test plan for the lab test and followed the agreed test plan on the test day. Taking photo evidence of whether components survived for later reference. Taking notes for anomalies occurred during the test. Summarize the test result by writing up the test report.
- Design electronic hardware for the team for various purposes. Defining the requirement in a meeting with the team leaders. Finish the schematics using the Altium designer and pass the team leader's check. Designed PCB using Altium Designer.
- Soldering the surface mount and through-hole components.
- As a team of 3, conducted numerical simulations for various purposes. Defining the required simulation goal and deliverables. Understand the physics model and problems for setting up the simulation and set up the physics model in MATLAB/Simulink or Python. Conducting written/verbal communications of results to the rest of the team.

Targetted Reentry Drag-sail Mission Team Lead, 11/2021 - 03/2023
Auckland Programme For Space Systems, Auckland

- As a leader, manage the task lists and give tasks to team members base on their strengths. Led the team to finish the project proposal, poster, and video and won the 2020 APSS satellite proposal challenge.
- As a result, this P4P acquired an overall A+ grade, where only about 10 people of my year acquired the same grade.

Canard Controlled Model Rocket

- Aim to design and manufacture a canard-controlled model rocket which can control its yaw, pitch and roll angle during flight with front wings (canards)
- Following Minimum Viable Product principle, design a simple solution that does the job first then further develop the solution.
- Use trail-and-error together with research to print the proper 3D printed components for complex mechanical systems.
- 1 failed rocket launches so far, still iterating.

Simulink Simulation for Canard Controlled Model Rocket

- Aim to simulate the canard-controlled model rocket during flight to test the rocket's maneuverability.
- By fully understanding the physical problem, define the simple analytical model and further enhance the model to involve more complex situations.
- Using visualization blocks to visualize the canard-controlled model rocket.

Industrial RC Lawnmower fixing project

- Aim to repair the degenerated industrial RC lawn mower in my mother's backyard.
- Using multimeter to diagnose the problem of the mechatronic components critically.

- Designed and tested a niche guidance scheme for drag-sail to control its landing location. Conducted literature review for the existing scheme and used MATLAB to implement the test environment, algorithm, and Monte Carlo simulation. As a result, 93.75% of the Monte Carlo simulation successfully guided the drag sail to randomized selections of dedicated landing locations.
- Assisted drag-sail prototype design with the team member. Based on the previous design, suggest the change list for the next iteration. Using Autodesk Inventor to participate in the CAD modeling of the new prototype. Test the prototype and analyze the result for further iterations.
- Documenting the mission proposal and preliminary report for the drag-sail mission.
- Reporting to the staff fortnightly for progress updates.

- Fixed and repaired actual mechanical components such as brushed DC motors, linear actuators, and redesigned the wire harness for the RC system.
- Currently designing a PCB for a computer-controlled system.

REFERENCE

Given upon request