



RESEARCH PORTFOLIO

Special Programme in Undergraduate Research (SPUR) Application

Kimi Yang
Year 2, B.Comp. Computer Science
National University of Singapore

Kimi Yang
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Research Profile

I am a Year 2 Computer Science and NUSC student at the National University of Singapore interested in computer vision, machine learning, robotics, and autonomous systems. My experience so far has primarily come from technical projects rather than formal academic research, such as personal or group projects and hackathons.

Research Interests

Computer Vision

I am interested in how machines can interpret visual information and use it to make decisions in real-world environments. My first exposure to computer vision came through robotics, where I worked with object detection and vision-based localization under varying lighting, distance, and viewing conditions.

AI/Machine Learning

I am interested in applying machine learning to practical problems, particularly where models need to operate with imperfect or limited real-world data. I enjoy experimenting with model behaviour, understanding failure cases, and exploring how data quality and system design affect performance.

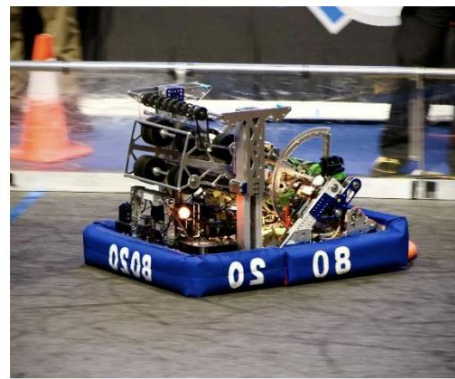
Robotics

Robotics interests me because it combines software, algorithms, sensing, control, and physical systems into one problem. I am especially interested in autonomous robots that must estimate their state, interpret their surroundings, and make reliable decisions in uncertain environments.

Past Experiences

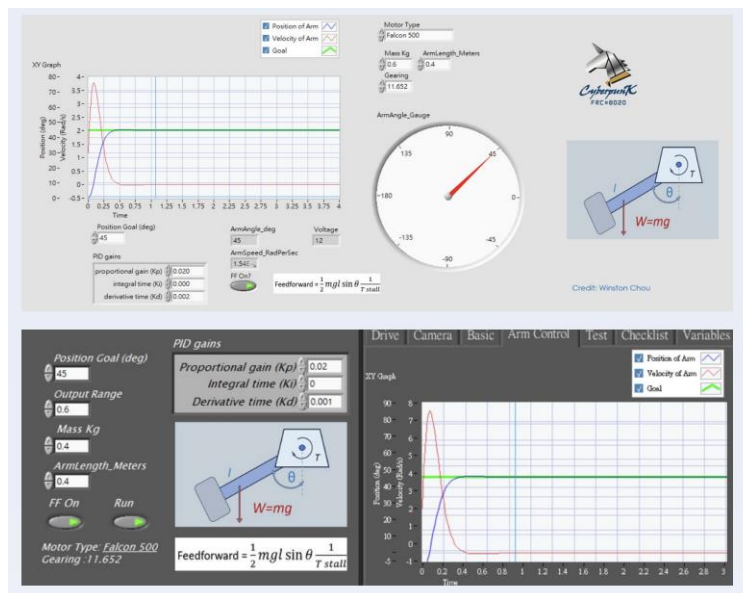
FIRST Robotics Competition

During high school, I participated in the FIRST Robotics Competition and served as the software lead in the team. My work included control-system tuning, computer vision, odometry, and sensor-based pose estimation, giving me early experience in developing and testing algorithms on a real robotic platform.



PID and Feedforward Tuning

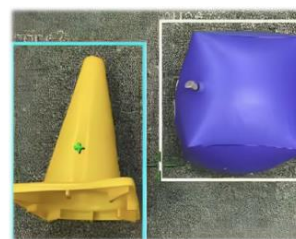
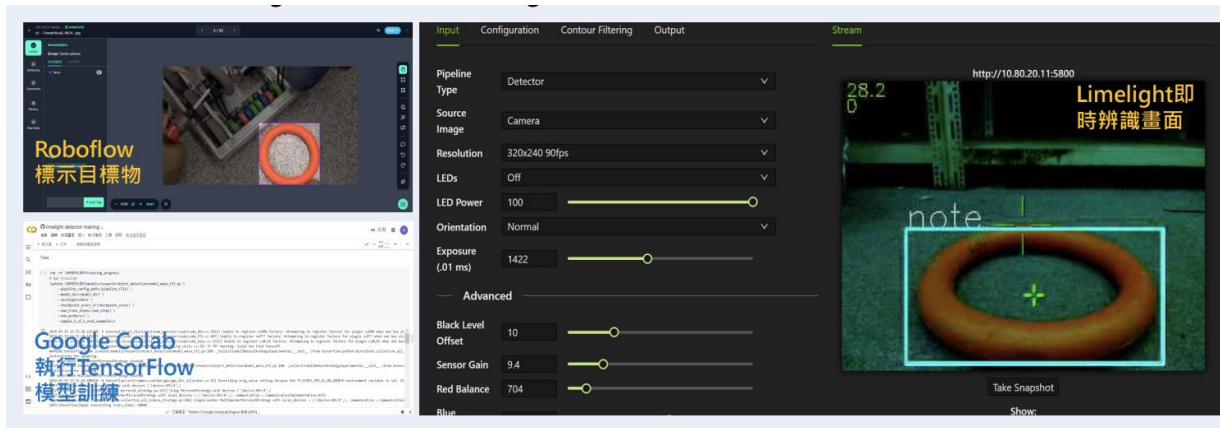
I worked on tuning PID controllers and feedforward parameters for robot mechanisms and autonomous movement. This involved observing system behaviour, identifying sources of error or instability, adjusting parameters, and repeatedly testing the system until its response became more accurate and consistent.



Computer Vision

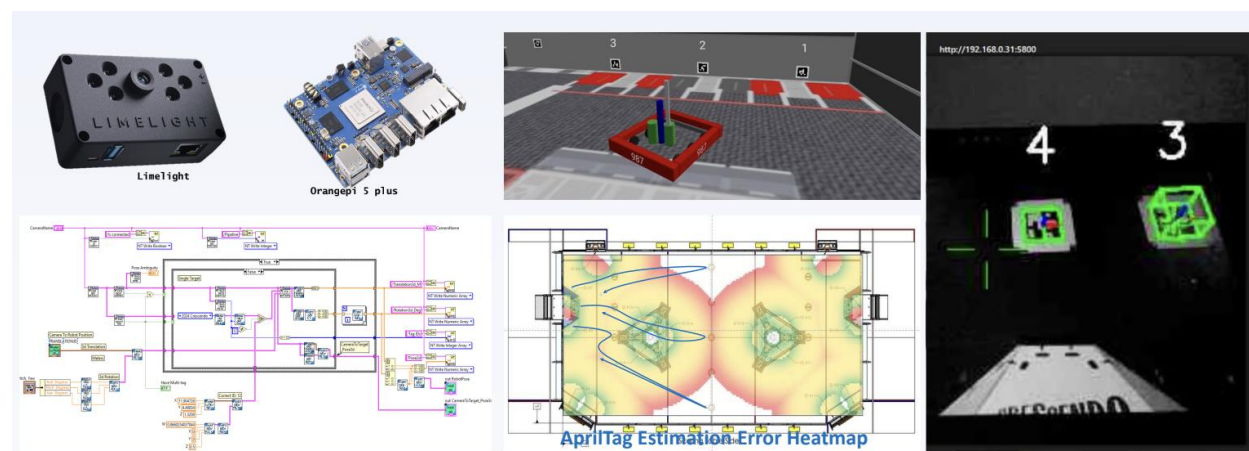
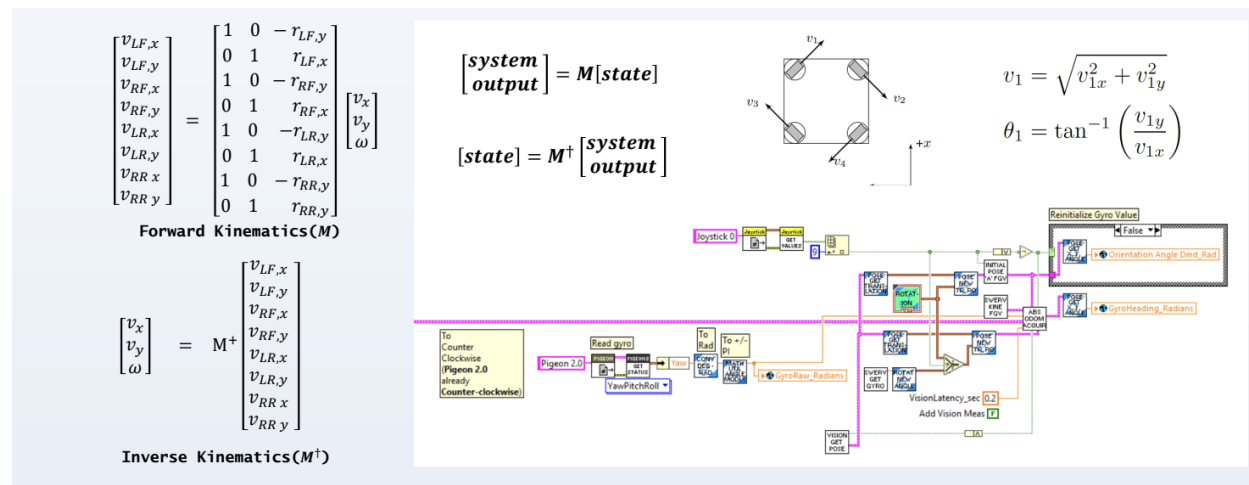
I worked on computer vision for detecting game objects and assisting with autonomous aiming. Our team collected and annotated images using Roboflow and trained YOLO-based object detection models, iteratively testing their performance under different lighting conditions, camera angles, distances, and backgrounds.

Also, there are provide reflective tape and Apriltags provided on the field, I have also worked on identifying those targets and transforming raw data to useful parameters such as distance for our robot to perform auto aiming.



Odometry and Pose Estimator

I worked with wheel odometry and vision measurements to estimate the robot's position on the field by tuning a simple Unscented Kalman Filter(UKF). This exposed me to the challenges of accumulated sensor error and motivated the use of sensor fusion techniques to combine multiple sources of information for more reliable localization.



Software Project

CKAPP

CKAPP is a campus app with ~3000 downloads. It was designed to enhance the daily experience for students at Taipei Municipal Jianguo(Chien Kuo, CK) High School by integrating class schedule management, to-do lists, cafeteria menus, nearby food maps, and real-time YouBike information, etc.

As the lead developer of this project, it was one of my earlier software development and gave me experience designing and implementing a complete application. Through the project, I gained practical experience in turning an initial idea into a working system and iteratively improving it based on technical constraints and user needs.



JioLeh!

JioLeh! is a location-based social application developed as part of NUS Orbital(Artemis Level). The project involved mobile application development, databases, location-based services, and experimentation with machine-learning-related features such as recommendations and content understanding. It also gave me experience working through technical trade-offs and evaluating which ideas were practical within the available data and development time.



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EDUCATION

National University of Singapore

Aug 2025 - Present

Bachelor of Computing in Computer Science / NUS College

- GPA: 4.72/5.00, Second Major in Mathematics
- Relevant coursework: Data Structures and Algorithms, Operating Systems, Linear Algebra, Calculus

WORK EXPERIENCE

CS1010 Programming Methodology (Singapore), Teaching assistant

Aug 2026 - Present

- Facilitate weekly programming tutorials and laboratory sessions covering C, debugging, Unix command-line tools, and computational problem-solving.
- Guide students through programming exercises using targeted questions and debugging strategies to develop independent problem-solving skills.

KEY PROJECTS

JioLeh, NUS Orbital Project (Artemis Level)

May 2026 - Aug 2026

- Co-developed a cross-platform social application enables users to discover and interact with places through an interactive location-based map.
- Engineered authentication, user profiles, persistent location data, reviews, photos, location-based chats, and friend invitations, utilising Flutter, Supabase, and Mapbox.
- Shipped an application in a two-person team, leveraging feature branches and two-week development sprints

CK APP, Lead Developer

Feb 2024 - Apr 2025

- Co-founded and led development of CK APP, a student-focused campus application.
- Achieved approximately 3,000 downloads across iOS and Android platforms.
- Designed and implemented core features such as class scheduling, task management, cafeteria menus, nearby food maps, and real-time YouBike integration.

LEADERSHIP EXPERIENCE

Singapore Taiwanese Student Association, Public Relations Codirector, Marketing

Aug 2025 - Present

- Develop and coordinate publicity campaigns for association events across social media and other student communication channels.
- Create promotional content and collaborate with Head Coordinators to strengthen event visibility and engagement within the Taiwanese student community.

NUS College Mentorship Programme, School of Computing Faculty Coordinator

May 2026 - Present

- Lead the School of Computing peer mentorship programme, coordinating mentors and supporting incoming students during transition to university.
- Organise faculty-specific engagement initiatives and serve as a liaison between mentors, mentees, and wider NUS College community.

FIRST Robotics Team Cyberpunk, Software Lead

Aug 2022 - Apr 2025

- Led development of competition robot software for localisation, autonomous navigation, and vision-based functionality.
- Developed computer vision and object detection functionality and coordinated with mechanical and electrical sub-teams.

TECHNICAL SKILLS

- Programming Languages: C, C++, Java, Python, Dart, JavaScript
- Frameworks: Flutter, Vue.js
- Technical Certificate: Coursera Machine Learning Specialisation

AWARDS

- National AI Student Challenge (NAISC) 2026 — Workato Challenge Track Finalist